

Introduction

Multi-mode adhesives are recent systems that can be applied either with the etch-and-rinse or the self-etch strategy.

Ultramorphological characterization of the resin-dentin Interdiffusion zone is a widely used method to compare adhesive systems.

Objectives

To characterize the resin-dentin interdiffusion zone promoted by two multimode adhesive system, applied as a self-etch or as a etch and rinse system with transmission electron microscopy (TEM).

Materials and Methods

- Twelve dentin discs were obtained from twelve human caries free molars;
- Multimode adhesive systems [Futurabond U (Voco) and Scotchbond Universal (3M-ESPE)] were used in self-etch and etch-and-rinse mode (n=3), according to manufacturer's instructions;
- Specimens were restored with GrandioSO Flow resin (Voco) and sectioned 24h after, with a precision saw [IsoMet 1000 precision saw(Buehler)] in order to obtain sticks with a cross section of 0.8 ± 0.2 mm;
- Specimens were sectioned with an ultra-microtome (LKB Ultratome III) and processed to TEM analysis (Hitachi H-7650), with an accelerating voltage of 100KV.

Results

TEM analysis revealed a thicker resin-dentin interdiffusion zone for etch-&-rinse than self-etch protocol, as expected, in both adhesive systems (Figures 1-4). Hydroxyapatite crystallites and some individual collagen fibers were observed within the hybrid layer.

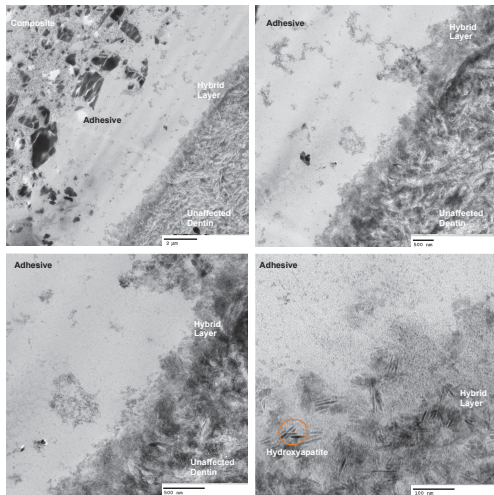


Figure 1 – TEM micrograph of Futurabond U, self-etch mode. a) 2kx; b)5kx; c)10kx; d)50kx

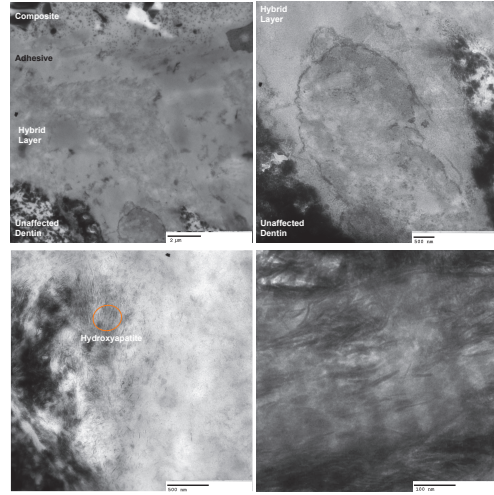


Figure 2 – TEM micrograph of Futurabond U, etch and rinse mode. a) 2kx; b)5kx; c)10kx; d)50kx

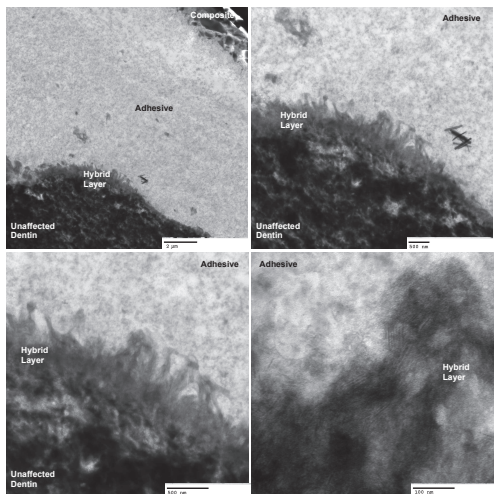


Figure 3 – TEM micrograph of Scotchbond Universal, Self-etch mode . a) 2kx; b)5kx; c)10kx; d)40kx

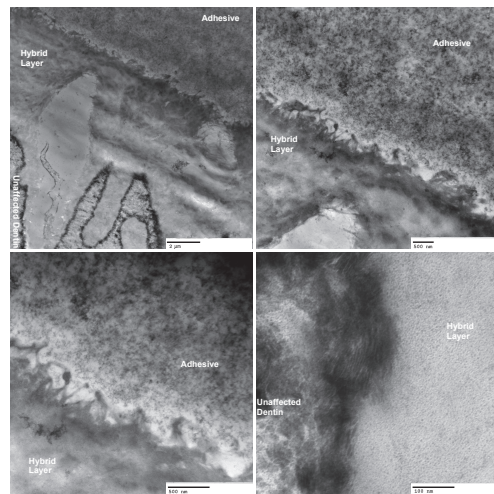


Figure 4 – TEM micrograph of Scotchbond Universal, etch-and-rinse mode. a) 2kx; b)5kx; c)10kx; d)50kx

Conclusions

The resin-dentin interdiffusion zones created by both adhesive systems had similar thickness and morphology. The results from this study should be complemented with other type of tests to fully characterize these adhesive systems.

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