

**Ministry of Higher education
& Scientific Research
University of Baghdad
College of Dentistry**



Comparative Evaluation of the Effect of Different Universal Adhesives and Bonding Techniques on the Marginal Gap of Class I Composite Restoration

(A SEM study)

A thesis

submitted to the council of the College of Dentistry University of
Baghdad in partial fulfillment of the requirements for the degree of
Master of Science in Conservative Dentistry

By

Ali Fadhil Abbas Al-Qrimli

B.D.S

Supervised by

Ass. Prof. Dr. Abdulla M.W. Al-Shamma

B.D.S., M.Sc., Ph.D.

Abstract

With increase using of composite material in posterior teeth, the concerns about the polymerization shrinkage has increased together with the concerns about the formation of marginal gaps in the composite/enamel interface. New generation of adhesives called “universal adhesive” have been introduced to the market in order to reduce the sensitive technique of bonding procedures to give the advantage of using the bonding system in any etching protocol without compromising the bonding strength. The aim of the study was to evaluate the marginal adaptation of two universal adhesives: Single bond™ Universal (3M) and Prime & Bond elect (Dentsply) using three bonding techniques: etch and rinse, self-etch and selective etching techniques after thermocycling.

Forty-eight sound maxillary first premolar teeth were included in the study. Teeth were divided into two groups according to the universal adhesive used, and each group was further subdivided into three subgroups according to the bonding technique used. Standardized class I cavities were prepared in the teeth followed by the restoring of teeth using Filtek™ Bulk Fill Posterior Restorative composite (3M) material. After finishing and polishing, the teeth were subjected to 500 thermal cycles at 5°-55°C with dwell time of 30 seconds. Teeth were then examined using SEM to measure the marginal gap at 12 points. Data obtained were then analyzed using one-way ANOVA test, LSD test and student t-test.

The results of this study the showed that etch and rinse bonding technique showed significantly the least marginal gap width for both adhesive types. The selective etch technique showed lower marginal gaps as compared to the self-etch technique but with no statistically significant difference. The result showed also that Single bond™ universal showed significantly the least marginal gap in all bonding techniques as compared to Prime and Bond elect.

According to the result of this study, regarding marginal gap, the etch and rinse technique remains the most suitable technique for adhesive restorations, and the type of universal adhesive used plays an important role in adhesion.