

*An Evaluation of Microleakage of Composite Restorative Materials Used to Seal Perforated Porcelain Fused to Metal Specimens
(In Vitro Study)*

*A thesis submitted to the
College of Dentistry, University of Baghdad
in Partial Fulfillment of the Requirements for
the Degree of Master of Science
in
Conservative Dentistry*

By

Emad Farhan AL-Khalidi

B.D.S

Supervised by

Professor Dr. Haitham J. AL-Azzawi

B.D.S, M.Sc.

2004

Abstract

This in vitro study was conducted to evaluate the effect of silane coupling agent (Monobond-S), different bonding systems (OptiBond FL which is a fourth generation bonding system and Excite which is a fifth generation bonding system) and different curing systems (conventional light curing system and SoftStart light curing system) on the sealing ability of two composite restorative materials (Tetric and XRV Herculite) when used to close an endodontic access opening in porcelain fused to metal samples.

One hundred-twenty eight ring-shaped samples were constructed using Nickel-Chromium alloy (Heraenium NA). Opaque and body porcelain were then applied and fired with a thickness of 2mm measured using a metal caliper device. Acrylic resin was used to construct 32 blocks, each block containing 4 samples.

The samples were divided into 4 major groups (of 32 samples in each). The first two groups were filled with Tetric composite material while the other two groups were filled with XRV Herculite composite material.

For each composite type, one of the two groups was treated with a silane coupling agent while the other was not.

Each main group was further divided into four subgroups (of 8 samples each) according to the curing method used (conventional and soft start) and the aging period (one day and 7 days).

All the samples were treated (etching, silane, bonding) and filled according to their subgroups and stored in normal physiological saline according to their aging period.

Thermocycling was done manually between two water baths, then all the samples were immersed in a container containing Pelican ink at 37°C for 24 hours. The samples were then dried, sectioned, and examined using stereomicroscope.

The data were statistically analyzed using ANOVA and student t-test and the results revealed that all samples showed marginal leakage but in different levels.

The results showed that the samples treated with silane coupling agent showed less microleakage than those without silanation which was statistically highly significant.

The results also showed that there was no statistically significant difference between samples cured using conventional light curing system and those cured using Soft Start light curing system.

The results also showed that the type of bonding system and composite material used in this study had no significant effect on reducing microleakage.

Samples thermocycled and aged for seven days produced significantly higher levels of microleakage than those thermocycled for one day.