

Ministry of Higher Education
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**Evaluation of marginal adaptation of a Class
V composite resin restorations with different
surface treatments after thermal and
mechanical load cycling
(An *in vitro* study)**

A thesis

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Abstract

Resin composites have improved greatly since their introduction and are now the materials of choice for most restorations. Many commercially available dental composites are based on methacrylate chemistry, and volumetric shrinkage that still remains a major drawback, in which gap formation may be result at tooth/restoration interface allowing passing of bacteria and oral fluids resulting in recurrent caries, pulpal irritation and post-operative sensitivity. This study was conducted with aim of comparing in vitro the marginal adaptation of a class V composite resin with five different surface treatments; laser with total- etch, laser with self-etch, total etch, self-etch only and laser only, at four different composite/tooth interface regions (gingival, mesial, distal and occlusal regions) of a standardized Class V cavity with Tetric N-ceram composite restoration after thermocycling and mechanical load cycling. The marginal gap was detected by scanning electron microscop. Twenty five sound human third molars of approximately comparable sizes were divided into five main groups of (five teeth, two cavities each) in each group according to the type of surface treatment that was used:

Group A: The teeth were irradiated with Er:YAG laser, then treated with total etch and Tetric N-bond.

Group B: The teeth were irradiated with Er:YAG laser, then treated with Tetric self-etch.

Group C: The teeth were treated with total-etch and Tetric N-bond.

Group D: The teeth were treated with Tetric self-etch.

Group E: The teeth were irradiated with Er:YAG laser, Tetric N-bond.

After filling of class V with Tetric N-ceram composite restoration the samples of groups of this study was stored at room temperture, then thermocycling at (5°C to 55 °C) of 500 cycles was using for all specimens, then they are subjected to mechanical loading (intermittent axial force of 50N and a total of 50.000 cycles). The

specimens were examined under scanning electron microscope at (1000 X) to measure the marginal gap width (the distance between the dental wall and the restoration) at gingival, mesial, distal and occlusal regions in micrometer using Tescan software, version 3.5.

Data were analyzed statistically by one way ANOVA test and least significant difference (LSD) test ($P \leq 0.05$ and $P \leq 0.01$). The results of this study showed that (group A) in which the teeth were treated with laser and total etch showed statistically highly significant more marginal adaption (least marginal gap) at gingival, mesial, distal and occlusal regions in comparison to other groups. Group E in which the teeth were treated with laser showed statistically highly significant less marginal adaption (higher marginal gap) at gingival, mesial, distal and occlusal composite/tooth interface regions in comparison to other groups. All the five groups showed statistically highly significant more marginal adaption at the occlusal region in comparison with gingival regions of class V composite restorations .