

**A comparison of Vertical
Marginal Fit of three different
types of All-ceramic crown
restorations**
(An in vitro study)

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Abstract

Purpose: The objective of this in vitro study was to evaluate and compare the vertical marginal fit of crowns fabricated with three different techniques: ZrO₂ CAD/CAM, ZrO₂ copy-milling machine and Lithium disilicate pressable ceramic, before and after porcelain firing cycles and after glaze cycles.

Materials and Methods: An acrylic resin model of a left maxillary first molar was prepared and duplicated to have Nickel-Chromium master die. Thirty die stone dies were distributed randomly (10 dies for each group) , group(I) system, copy milling (Amann Girrbach), group(II) heat pressable ceramic(Neytech system)and group(III) CAD/CAM (Amann Girrbach) . Marginal gaps along vertical planes were measured at four indentations at the (mid mesial, mid distal, mid buccal, mid palatal) before (Time 0) and after porcelain firing cycles(Time 1) and after glaze cycles(Time 2) using a light microscope at a magnification of ×100. One way ANOVA LSD tests were performed to determine whether the mean and standard deviation of sub group Time 2 between the three systems.

Results: The mean values of the group(III) Time 0 were (6.77µm), Time 1(8.75µm) and Time 2(10.62 µm), group(I) Time 0 (151.95µm), Time 1(157.37µm) and Time 2(159.52 µm) , and group(II) Time 0 (55.35µm), Time 1(63.85µm) and Time 2(65.55 µm) . One way ANOVA test revealed quantitative differences of the three groups. Comparing the mean values of marginal gap of the three tested groups at Time 2 revealed highly statistical significance(P<0.01).

Conclusions: Within the limitations of this study, it was concluded that the group(II) and group(III) demonstrated acceptable marginal fit; however, group(I) produced larger gap measurements and thus were unacceptable. The porcelain firing and the glaze firing cycles did not affect the marginal gap of group(I) and group(II) crowns; however, the porcelain firing and the glaze firing cycles affected the marginal gap of group(III) crowns. In general, the glazing cycle(time2) affected the marginal gaps of the three tested groups statistically a highly significant.