

*The Effect of Different Finishing Lines on
The Marginal Fit of Full Contour
Zirconia and Glass Ceramic CAD/CAM
crowns
(An in vitro study)*

A thesis

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Abstract

One of the major problems of all ceramic restorations is marginal gap between the crown margin and tooth structure. The objective of this *in vitro* study was to evaluate the effect of two gingival finishing lines (90° shoulder and deep chamfer) on the marginal fit of two types of full anatomic zirconia crowns (Zirkonzahn) and glass ceramic crowns (IPS e-max CAD) milled with CAD/CAM system .

Two dentoforn teeth of the maxillary left first molar were crown prepared with chamfer and shoulder finishing lines respectively and duplicated to have Nickel-Chromium master dies. Each metal die with its characteristic finishing line was used to construct sixteen dies. Crowns were fabricated according to the randomly distributed thirty two dies and are grouped as following: Group I, eight zirconia crowns on chamfer finishing line die; Group II, eight zirconia crowns on shoulder finishing line die; Group III, eight glass ceramic crowns on chamfer finishing line die; and Group IV, eight glass ceramic crowns on shoulder finishing line die. Marginal gaps were measured at four indentations at the center of each tooth surface. Sixteen previously established points were marked and the measurements were performed with the stereomicroscope (at a magnification of 160 X). The marginal fit of the samples were evaluated by calculating the mean measurements of each 16 points.

The results of this study showed that the least marginal gap was recorded for Group I (73.55 μ m), followed by Group II (92.60 μ m), and Group III (151.45 μ m), and the highest marginal gap was recorded by Group IV (162.34 μ m). One-way ANOVA test results revealed statistically highly significant difference among groups. Student t-test results showed that the shoulder finishing line produced significantly greater marginal gap on zirconia crowns (Group II) compared to chamfer finishing line (Group I). However, in glass ceramic crowns although chamfer finishing line (Group III) produced less marginal gap than shoulder

finishing line (Group IV), but the difference was not significant statistically. Student t-test results revealed that glass ceramic crowns produced significantly greater marginal gap compared to zirconium crowns regardless the type of finishing line design.

As a conclusion, deep chamfer margin would be more preferable than the shoulder especially for the zirconia full crowns. In addition, zirconia crowns would be more advisable than glass ceramic crowns regarding marginal adaptation.