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**The Effect of Different Pouring Intervals of
Conventional Impression on the Vertical
Marginal Fit of Full Contour Zirconia Crowns
in Comparison with Digital Impression
(An *in vitro* study)**

A thesis
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Abstract

The success and durability of indirect dental restorations are closely related to the marginal fitness, which is affected by many factors like preparation design, using of different fabrication techniques, and the procedure of taking final impression and its pouring time. The purpose of this *in vitro* study was to evaluate the effect of different pouring interval of conventional impression on the vertical marginal gap of full contour zirconia crowns in comparison with digital impression technique.

Forty sound recently extracted human permanent maxillary first premolar teeth of comparable size and shape were collected. Standardized preparation of all teeth samples were carried out to receive full contour zirconia crown restorations with deep chamfer finishing line (1mm), axial length (4mm) and convergence angle (6 degree). The specimens separated into two groups; **Group A:** eight specimens were scanned digitally by using Omnicam scanner; **Group B:** conventional impressions were taken for the remaining thirty two specimens which were further subdivided into four subgroups according to the time of impression pouring; **Group B1:** polyvinyl siloxane impressions were poured after 30 minutes; **Group B2:** polyvinyl siloxane impressions were poured after 24 hours; **Group B3:** polyvinyl siloxane impressions were poured after 7 days; **Group B4:** polyvinyl siloxane impressions were poured after 14 days.

All crowns were cemented to their respective teeth using conventional glass ionomer cement. Marginal discrepancy was measured at four points at each tooth surface. Thirty two points per tooth (sixteen points pre-cementation and sixteen points post-cementation) were measured using a digital microscope at (180X) magnification.

The results of the present study pre-cementation showed that group A shows the least marginal gap ($40.635 \pm 2.447 \mu\text{m}$) while group B4 showed the

highest mean of marginal gap ($90.971 \pm 5.470 \mu\text{m}$). One-way ANOVA test revealed a statistically highly significant difference among conventional impression subgroups. LSD test showed that group B2 provided the least mean of marginal gap ($48.867 \pm 3.306 \mu\text{m}$), with statistically significant difference when compared to group B1 and statistically highly significant difference when compared to group B3 and B4. Independent samples t-test showed that there was a statistically highly significant difference in the vertical marginal gap before cementation between digital impression technique and conventional impression. The results of post-cementation showed that group A shows the least marginal gap ($74.716 \pm 1.743 \mu\text{m}$) while group B4 showed the highest mean of marginal gap ($122.701 \pm 6.972 \mu\text{m}$). One-way ANOVA test revealed a statistically highly significant difference among conventional impression subgroups. LSD test showed that group B2 provided the least mean of marginal gap ($83.872 \pm 3.592 \mu\text{m}$), with statistically no significant difference when compared to group B1 and statistically highly significant difference when compared to group B3 and B4. Independent samples t-test showed that there was a statistically highly significant difference in the vertical marginal gap between digital impression technique and conventional impression after cementation. Paired samples t-test showed that there was a statistically highly significant increase in the vertical marginal gap for all groups after cementation.

As a conclusion, the pouring of conventional impression after 24 hours provides better marginal fit than other pouring intervals. The digital impression provides better marginal fit than conventional impression.