

# **Effect of different polishing systems and glazing on the surface roughness of full-contour zirconia**

A thesis

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## Abstract

Adjustment of any premature occlusal contact of any ceramic or zirconia restoration requires its polishing or reglazing in order to restore the smoothness of the restoration. The objective of this *in vitro* study was to evaluate the effects of different polishing systems and glazing on the surface roughness of full-contour zirconia.

Forty disks (diameter: 8 mm, thickness: 6.4 mm) were prepared from pre-sintered full-contoured zirconia block; they were colored and sintered in a high-temperature furnace at 1500°C for 8 hours. The specimens were then leveled and finished using grinding and polishing machine and adjusted using diamond disk. The specimens were then randomly divided into four groups (n=10), group I involves samples that were polished using (karat diamond polishing set, Vita zahnfabrik, Germany), group II involves samples that were polished with (zirconia polishing kit, SMEdent Medical Instrument Co., Shanghai, China), group III involves samples that were polished with (OptraFine<sup>®</sup> diamond polishing system, Ivoclar Vivadent, Germany), while group IV involves samples that were glazed using glazing medium (VITA Akzent Glaze AKZ 25, Vita zahnfabrik, Germany). Surface roughness values (Ra) (in  $\mu\text{m}$ ) of all the specimens were recorded at each stage of surface treatment of zirconia disks (leveling and finishing, adjustment of the samples and polishing / glazing) using surface roughness tester. Statistical analysis was carried out using one-way ANOVA and LSD tests.

The results showed that the glazing group recorded the lowest surface roughness mean value, followed by (OptraFine<sup>®</sup> diamond polishing system), then (zirconia polishing kit) and finally (karat diamond polishing set) which showed the highest mean of surface roughness. For

all groups, there was a statistically very high significant difference of (Ra) value before and after adjustment of the samples. Moreover, there was a statistically very high significant difference in (Ra) value when comparing the adjusted samples with the polished and glazed ones. Karat polishing set group showed a statistically highly significant difference with zirconia polishing kit group ( $P < 0.01$ ). Both, karat polishing set and zirconia polishing kit groups showed a statistically very highly significant difference ( $P < 0.001$ ) with (OptraFine<sup>®</sup> polishing system) and glazing groups. On the other hand, no statistically significant difference was found between glazing and (OptraFine<sup>®</sup> polishing system) groups ( $P > 0.05$ ).

The results of this study showed that adjusting full-contour zirconia with diamond bur or disk resulted in a significant increase in (Ra) that necessitates its polishing or glazing to restore the surface smoothness. Furthermore, both glazing and OptraFine<sup>®</sup> polishing system provided the best surface smoothness, so glazing can be substituted with chairside polishing using OptraFine<sup>®</sup> polishing system.