

Effect of Polishing on Color Change of 3D-Printed Temporary Crown Resins Stained *In Vitro*

Vivian Ngo¹, Gary Frey, D.D.S.², Marilia M. Sly, D.D.S., M.S.D.², Yonca Korkmaz Ceyhan, D.D.S., Ph.D.², Rade Paravina, D.D.S., M.S., Ph.D.², F. Kurtis Kasper, Ph.D.²

1. University of Houston, Houston, Texas USA
2. University of Texas Health Science Center, School of Dentistry, Houston, Texas USA

Objectives

Multiple resins on the market can be applied to produce 3D-printed temporary crowns. This study's objective was to evaluate the effect of polishing on color changes *in vitro* of five 3D-printed resins marketed for temporary crown production.

Methods

Disc-shaped samples (n=400) were 3D-printed (Asiga Max UV) in each of five temporary crown resins: Asiga DentaTooth (AD), Dentona Optiprint Lumina (DO), Pro3dure Printodent (PP), Bego VarseoSmile Temp (BV), and GC Temp Print (GC). Half of the samples were left unpolished, while the other half were finished using silicon carbide abrasive papers #240, #320, and #600 for 10 seconds each (using an EcoMet 6 grinder-polisher under water cooling) and polished with PoGo disks for 40 seconds. Color measurements were performed before and after exposure to 3.8-day staining (equivalent to one year of service with 15-minute exposure per day) in coffee (C), red wine (W), black tea (T), Dr. Pepper (P) and distilled water (D, control) using a benchtop spectrophotometer. The CIEDE2000 color differences in (ΔE_{00}) were calculated. A three-way ANOVA was used to compare the effects of polishing, material, and staining solutions on color change ($\alpha=0.05$).

Results

Significant effects of polishing, material, and staining liquid were found on color differences ($p<0.001$), and significant interaction effects were observed among all variables ($p<0.001$). Polishing generally reduced color changes upon staining, but the degree of the effect depended upon the material and the staining solution.

Conclusion

Polishing 3D-printed temporary crown materials tended to decrease color changes from staining *in vitro*, with variable effects depending on the specific material and staining solution.

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