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### Color Change of 3D-Printed Temporary Resins Immersed in Staining Solutions

**Objectives:** To compare the color stability of five 3D-printed temporary resins exposed to staining.

**Methods:** Disc-shaped specimens, 10 mm in diameter and 2 mm thick, were manufactured using five 3D-printable temporary resins: Asiga DentaTooth (AD), Dentona Optiprint Lumina (DO), Pro3dure Printodent (PP), Bego VarseoSmile Temp (BV), and GC Temp Print (GC). The specimens were printed using a 3D-printer (ASIGA MAX UV), following manufacturers' instructions for printing and post-print processing. Specimens were finished using silicon carbide abrasive papers #240, #320, and #600 for 10 seconds each (EcoMet 6 grinder-polisher under water cooling) and polished using PoGo disks for 40 seconds. Color measurements were performed before and after exposure to 3.8-day staining (equivalent to a 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 ( $\Delta E_{00}$ ) were calculated. A two-way ANOVA was used to compare the effect of material and staining solutions. Tukey's post-hoc multiple comparison test assessed differences among levels within each variable ( $\alpha=0.05$ ).

**Results:** CIEDE2000 mean (sd) color differences of 3D-printed temporary resins before and after staining in different solutions:

Materials	C	W	T	P	D
AD	4.3(0.6)	7.1(1.9)	5.2(0.6)	0.9(0.5)	0.3(0.2)
DO	3.9(0.4)	9.4(0.8)	4.2(0.6)	0.7(0.2)	1.2(0.2)
PP	5.0(0.9)	10.1(1.1)	6.0(0.9)	3.1(0.5)	2.0(0.5)
BV	5.4(1.0)	7.0(0.5)	2.9(0.3)	0.7(0.4)	0.5(0.2)
GC	5.0(1.5)	7.1(1.8)	4.4(1.3)	1.1(0.2)	1.5(1.6)

Statistically significant effects of the material and staining solution were recorded ( $p<0.001$ ) and a significant interaction effect was observed ( $p<0.01$ ). W generally produced greater color change compared to all the other staining solutions for all the resin materials tested.

**Conclusion:** Color changes upon staining of 3D-printed temporary resins were material- and staining solution-dependent.