

Aging-dependent Color Changes of 3D-printed Temporary Restorations

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

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 150 kJ/m² of accelerated aging, using a benchtop spectrophotometer. The CIEDE2000 color differences (ΔE_{00}) were calculated. A one-way ANOVA was used to compare the effect of the material on the color change observed after accelerated aging. Tukey's post-hoc multiple comparison tests assessed differences among materials ($\alpha=0.05$).

Results: CIEDE2000 mean (sd) color changes of 3D-printed temporary resins before and after accelerated aging.

Materials	Aging
AD	0.39 (0.10)
DO	4.09 (1.11)
PP	1.01 (1.27)
BV	2.88 (0.59)
GC	10.02 (3.35)

A statistically significant effect of material on color change was observed ($p<0.001$). GC showed statistically significantly greater color change compared to all other 3D-printable temporary resins tested ($p<0.001$).

Conclusion: Color changes upon accelerated aging of 3D-printed temporary resins were material-dependent.