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Discoloration Properties of a Fine Hybrid Versus a Nanofiller Composite

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Objectives: The objective of this study was to compare the discoloration properties of a conventionally microglass-filled, fine hybrid composite (VENUS dentinA2, Heraeus Kulzer[HK]) with those of a nanofillers/ nanoclusters containing one (Filtek SUPREME dentinA2, 3MEspe) due to aging according to ISO7491 and due to storage in staining beverages after different finishing procedures.

Methods: Sample size: 20mm in diameter, 1mm thick, cured in light oven (Heraflash, HK) 90s each side. Specimens were finished with SiC-paper (grit#4000), superfine SofLex discs and superfine diamond burs (HK) or polished with PoGo (Dentsply). SiC-finished samples were kept dry and dark at room temperature for base color, became irradiated according to ISO7491 and got stored in water at 37°C, 24h. Finished samples became immersed in black tea, red wine and coffee for 72h at 37°C. After removal from storage media the specimens got cleaned by tooth brushing at half for 5min (TePe-brush, OdolMed3). Color values were recorded with a 2mm aperture of SF600 colorimeter (Datacolor). From L*a*b*-values color difference was calculated as dE according to Cie*Lab system.

Results: Base color: VENUS[V]/SUPREME[S] - L=62.6,a=(-0.7),b=8.2[V]/L=60.9,a=(-0.1),b=11.2[S] - color difference dE from base color: Water - 0.8[V]/0.8[S], ISO7491 - 1.5[V]/4.2[S]; SofLex - 0.9[V]/0.5[S], coffee - 8.2[V]/8.6[S]; 1/2CLEANED - 3.8[V]/3.3[S]; diamond bur - 0.5[V]/0.9[S], coffee - 10.3[V]/16.2[S], 1/2CLEANED - 4.1[V]/3.3[S]; PoGo - 1.8[V]/1.7[S], coffee - 6.8[V]/6.2[S], 1/2CLEANED - 4.4[V]/4.5[S].

Conclusion: After water storage color change was indistinguishable (dE=0.8<3). SUPREME manifested a visible change after ISO7491 treatment (dE=4.3>3), whereas VENUS did not (dE=1.5). Among all beverages coffee led to the strongest stains. SUPREME stained strongest when finished with a diamond bur (dE=16.2). Finished with SofLex' or polished with PoGo both materials showed comparable stains. Tooth brushing reduced coffee's stains but a clearly visible discoloration remained (dE~3.3-4.5). Nanocomposites are not superior to conventional fine hybrids; in some cases the investigated SUPREME was worse.