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Color Stability of Prosthodontic Tooth Polymers Stored in Chromogenic Solutions.

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Objectives Numerous additive polymers have been introduced in just the last few years, but little research is available on their color stability. This study evaluated the color stability (stainability) of additive and subtractive computer assisted manufacturing (CAM) polymers compared to a manufactured denture tooth control when immersed in chromogenic staining solutions of wine, coffee and water control, and measured periodically over an extended time period.

Methods Nine removable and fixed prosthodontic tooth materials with different chemical compositions/fabrication processes were evaluated. Materials tested: FLX-Flexera(DeskTop Dental), ONX-OnX(SprintRay), VARVarseoSmileCrownPlus(Bego), TRS-Trusana(Myerson), TDS-TrueDent(Stratasys), TRG-TrueDentGlossy (printed with a glossy surface), DNT-DentureTeeth(Dentca), IVO-Ivotion(Ivoclar), VIV-SR-Vivodent(Ivoclar), IPN-Portrait-IPN Denture Teeth (DentsplySirona) as control. Total of 270 tiles were fabricated according to manufacturers' systems n=10/group measuring 10x15x1.5+/-0.1mm thickness approximating ADA specification #12. IPN teeth were ground flat and specimen groups polished per protocol. Specimens were immersed into 3 standardized solutions of COFFEE, Syrah WINE, and distilled WATER (control) at 40+/-1○C with constant stirring dark chamber. The degree of color change was monitored over time with measurements made at 0,2,4,6,8,10,14,24 weeks. A portable color measured CIELAB values of each specimen and color differences (ΔE) calculated. Two-Way ANOVA and Tukey post-hoc tests were used for comparisons ($p<.05$).

Results PMMA materials VIV and IVO demonstrated the lowest overall ΔE values while FLX and DNT had the highest. In WATER (Graph1), mean ΔE of DNT was significantly higher than the control. For COFFEE (Graph2)- FLX, ONX, and DNT exhibited significantly higher mean ΔE than the control. In WINE (Graph3), the mean ΔE of FLX and DNT were significantly higher while VIV was significantly lower than the control.

Conclusions For measured color changes, only the subtractive PMMA VIV was significantly lower than the control. For all material groups the mean ΔE was significantly greatest for wine followed by coffee compared to water control. The additive materials TRD, TRG, ONX, TRU, VAR were similar in mean ΔE compared to the control denture tooth.