



To Evaluate the Effect of Intraoral Conditions on Colour Stability & Surface Roughness of thermocycled Chairside Hybrid Ceramics: An in Vitro Study

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ABSTRACT

Introduction: Hybrid ceramics (HCs), such as Vita Enamic and GC Cerasmart, have gained prominence for aesthetic restorations due to their balanced mechanical properties, which combine ceramic strength with polymer flexibility. Their performance, however, is challenged by abrasive oral conditions like mastication, routine hygiene, and exposure to acidic agents. Thermal fluctuations simulated by thermocycling and chemical degradation from carbonated beverages are known to compromise the surface integrity and color stability of these materials, directly impacting the longevity and aesthetic success of the restoration.

Aim: The present study aims to evaluate the effect of simulated intraoral conditions, specifically thermocycling, chemical exposure, and toothbrushing, on the colour stability and surface roughness of two types of thermocycled chairside hybrid ceramics.

Method: A total of 32 samples, split evenly between Vita Enamic and GC Cerasmart (n=16 each), were fabricated into 7x7x2 mm blocks and prepared with either a glazed or polished surface finish. Samples underwent thermocycling (500 cycles), followed by 14 days of sequential immersion in artificial saliva and carbonated beverages, and finally subjected to 1,000 brushing cycles. Colour change (ΔE) was measured using a spectrophotometer, and surface roughness (R_a) was measured using a profilometer.

Results: Intergroup analysis revealed that GC Cerasmart exhibited significantly greater total colour change (ΔE) compared to Vita Enamic in both glazed and polished states ($P < 0.05$). Polished surfaces for both materials showed higher ΔE than glazed surfaces. Brushing led to a significant increase in surface roughness (R_a) across all groups, but no significant inter-material difference in wear was found.

Conclusion: Vita Enamic demonstrated superior colour stability, particularly when glazed, while GC Cerasmart was more susceptible to discoloration. Both hybrid ceramics experienced comparable, significant surface degradation when subjected to simulated brushing, suggesting similar susceptibility to mechanical wear under intraoral conditions.

Keywords: Hybrid ceramics, Cerasmart, Enamic, Color stability, Surface roughness.

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