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The impact of cement mixing and storage errors on the risk of failure of glass-ceramic crowns.

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This study evaluated the impact of different mixing ratios and wrongly stored blends of dual-curing composite cements on Empress2 glass-ceramic crowns by means of a flexural strength test and a fracture resistance test. Thermally damaged blends and fresh blends were mixed using different mixing ratios of dual-curing Panavia F and Variolink II composite cement (2:1; 1:1; 1:1.5; 1:1.75; base/catalyst). Sixteen groups of rectangular beams of both cements (two blends, four ratios, chemical-curing, light-curing) were constructed. Their flexural strength was determined in a three-point bending test. Furthermore, 64 Empress2 all-ceramic crowns were luted onto human molars, again using fresh and thermally damaged blends as well as different mixing ratios of the luting agents. After aging, fracture resistance was investigated. The flexural strength of dual-curing composite cements was influenced to a statistically significant extent by mixing ratios and storage conditions. In particular, the chemical curing mode of these cements was affected by the thermal damage of the blends. However, this study could not demonstrate a significant impact on the fracture resistance of Empress2 glass-ceramic crowns when different mixing ratios or wrongly stored cements were used. Dual-curing composite luting agents seem to tolerate a wide range of mixing errors, but their chemical curing mode may be affected by storage errors.

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