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Abstract

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The aim of this study was to evaluate the shrinkage stress of three composites under different polymerization methods: halogen conventional polymerization (G1), halogen "soft-start" polymerization (G2) and LED polymerization (G3). The composites tested were Filtek Z-100 (3M/ESPE), Filtek Z-250 (3M/ESPE) and Solitaire 2 (Heraeus Kulzer). For G1, an XL-3000 (3M/ESPE) curing unit with light intensity of 507 mW/cm^2 was employed. In G2, the same light unit was used, but with a reduced light intensity in the first 20 s (166 mW/cm^2). In G3, an Ultrablue I (DMC) LED curing unit with light intensity of 125 mW/cm^2 was used. The test was performed with a DL 2000 (EMIC) universal testing machine and two metallic molds with a 1 mm space between them. The composites were inserted in the space between the molds and light cured according to the protocols mentioned above. Stress was registered in different periods of time: 10, 20, 40, 60, 90 and 120 s. A significant linear increase of the shrinkage stress over time was observed, except for Z-100 in G2. Generally, LED polymerization (G3) reduced the generated stress when compared to conventional halogen polymerization (G1). In G3, the composite with the additional co-initiator presented lower stress when compared to the other composites tested. The combination between composite and polymerization method produced different patterns of stress behavior. LED polymerization reduced the initial shrinkage stress of the three materials and was influenced by the presence of co-initiators in the composites.

Keywords : Composite resins; Dental stress analysis; Physical and chemical properties.

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