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Effect of various visible light photoinitiators on the polymerization and color of light-activated resins

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Abstract:
The purpose of this study was to investigate effects of various visible light photoinitiators on the polymerization efficiency and color of the light-activated resins. Four photoinitiators, including camphorquinone, phenylpropanedione, monoacrylphosphine oxide (TPO), and bisacrylphosphine oxide (Ir819), were used. Each photoinitiator was dissolved in a Bis-GMA and TEGDMA monomer mixture. Materials were polymerized using dental quartz-tungsten halogen lamp (QTH), plasma-ark lamp and blue LED light-curing units, and a custom-made violet LED light unit. The degree of monomer conversion and CIE *L*a*b** color values of the resins were measured using a FTIR and spectral transmittance meter. The degree of monomer conversions of TPO- and Ir819-containing resins polymerized with the violet-LED unit were higher than camphorquinone-containing resin polymerized with the QTH light-curing unit. The lowest color values were observed for the TPO-containing resin. Our results indicate that the TPO photoinitiator and the violet-LED light unit may provide a useful and improved photopolymerization system for dental light-activated resins.

Key words:
Light-activated resin, Photoinitiator, Color

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