Evaluation of Radiopacity of Flowable Bulk-Fill Composites Using Digital Radiography

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Objectives: New flowable composites that may be bulk-filled in layers up to 4 mm are indicated as base beneath posterior composite restorations. Radiopacity is among the several important requirements that such material should meet. The aim of this study was to evaluate the radiopacity of flowable bulk-fill composites and to compare it with conventional flowable composites using digital imaging. Materials and Methods: Ten standard specimens (5 mm in diameter, 1 mm in thickness) were prepared from four different flowable bulk-fill composites (SDR, Dentsply; Filtek Bulk Fill, 3M ESPE; X-tra Base, Voco; Venus Bulk Fill, Kulzer) and nine different conventional flowable composites. Radiographs of the specimens were taken together with 1-mm-thick tooth slices and an aluminum (Al) step wedge using Dürr VistaScan Mini digital imaging system (Dürr Dental). For the radiographic exposures, a storage phosphor plate (size 4, 5.7 x 7.6 cm) and a dental x-ray unit at 70 kVp and 7 mA were used. The object-to-focus distance was 30 cm, and the exposure time was 0.2 s. The grey values of the materials were measured using the histogram function of the system own software (DBSWIN 5.2.0) and the radiopacity was calculated as equivalent thickness of Al. The data were analyzed statistically (p<0.05). Results: Venus Bulk Fill (Heraeus Kulzer) showed the highest radiopacity value, whereas Arabesk Flow (Voco) showed the lowest. The radiopacity comparison for the flowable bulk-fill composites was Venus Bulk Fill ≥ X-tra Base > SDR ≥ Filtek Bulk Fill. Conclusions: All test materials have radiopacity values greater than the radiopacity of dentin and all flowable bulk-fill composites have radiopacity values greater than that of enamel. Clinical Significance: As the radiopacity values of flowable bulk-fill composite materials are greater than dentin and enamel, it is not possible to misinterpret them as secondary caries lesions.