

Abstract

Effect of cavity width on microleakage of the high viscosity bulk-fill composite

Introduction: Microleakage of a restoration is an important factor involved in the clinical failure of a composite restoration. The present study aimed to assess the effect of cavity width of Class 5 restorations on microleakage of high viscosity bulk-fill and conventional composites.

Methods and Materials: A number of 96 class 5 cavities were prepared on the buccal surface of molar teeth. Two types of composite, including a high viscosity bulk-fill (Opus Bulk fill, FGM) and a conventional (Ilis, FGM) composite, were used for the purpose of the study. The adhesive procedures were performed using a universal adhesive (Ambar Universal APS, FGM) with the etch-and-rinse strategy. In each composite group, cavities with different widths were prepared, including cavities with diameters of 2, 4, and 6 mm and a depth of 4 mm. Half of the specimens were subjected to 10,000 thermal cycles of 5-55°C. Thereafter, the amount of microleakage was investigated using the dye penetration technique. The Kruskal-Wallis and Mann-Whitney U tests were used for statistical analysis.

Results: Microleakage was observed in all groups. As evidenced by the obtained results, there was no difference in the microleakage scores of different groups with different cavity dimensions, types of composite, and with exposure to thermocycling (P=0.815).

Conclusion: The amount of microleakage of the bulk-fill composite was similar to that of conventional composite used in the present study, and it was not affected by the diameter of Class 5 cavity. Considering the 4mm limit of layer thickness, the high viscosity bulk-fill composites can be used without any concern about the total volume of composite material and the consequent polymerization shrinkage stress.

Keywords: Microleakage, Resin composite, Bulk fill, Cavity width, Composite restoration