

Effect of Type of Restorative Material on Porosities, Interfacial Gaps and Microhardness of Small Class I Restorations

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Purpose: This study compared microhardness, porosities and interfacial gaps of flowable, bulk-fill flowable, nanocomposite and bulk-fill composite in small class I cavities.

Methods and Materials: 40 human molars were divided into 4 groups (n=10). Standardized class I cavities were prepared with 4 mm depth using carbide round burs #8 (diameter 2.3mm). After selective etching, Single Bond Universal (3M ESPE) was applied and cured. In group 1 cavities were restored with Filtek™ Z350 XT Flowable (3M ESPE, St. Paul, MN, USA) in two layers and each layer was cured for 20 seconds. Group 2 cavities were restored with Filtek™ Bulk Fill Flowable Restorative (3M ESPE) as one layer and cured for 20 seconds. In group 3 cavities were restored with Filtek™ Z350 XT Universal Restorative (3M ESPE) in two layers and each layer was cured for 20 seconds. Group 4 cavities were restored with Filtek™ Bulk Fill Posterior Restorative (3M ESPE) as one layer and cured for 20 seconds. After finishing and polishing specimens were sectioned. One section was chosen randomly for the Vickers microhardness (HV) evaluation and the other section was used for assessment of porosities and interfacial adaptation (IA). IA was measured as the percentage of the gap length relative to the whole margin length.

Results: There was a statistical difference between the materials in HV on both pulpal and occlusal sides of the cavities with Filtek™ Bulk Fill Flowable Restorative presented the lowest and Filtek™ Z350 XT Universal Restorative the highest. The mean pulpal HV of all materials exceeded 80% of the occlusal HV. There was no statistical difference between the materials in porosities. IA percentage was found to be higher in bulk fill flowable materials compared to other materials.

Conclusion: Bulk fill resin composite materials have lower microhardness than their conventional counterparts. In small class I cavities the number of porosities was similar between bulk fill and conventional materials and the IA percentages were highest in bulk fill flowable composites.

Biography:

Dr. Qasem Alomari graduated from University of Jordan in 1993. He received his Master Degree in Dental Science and Certificate in Operative Dentistry from University of Iowa (USA). In 2003, he completed the American Board of Operative Dentistry. Between 2000 and 2004 he was teaching Restorative Dentistry in Jordan University of Science and Technology. Since 2004 he is working at Kuwait University. He is now a Professor of Operative Dentistry and the Chairman of the Department of Restorative Science. Dr. Alomari has more than 30 publications and his topic of interest is resin composite materials and polymerization shrinkage.