1- **Two-year clinical evaluation of ormocer, nanohybrid and nanofill composite restorative systems in posterior teeth**

**PURPOSE:** To evaluate and compare the 2-year clinical performance of an ormocer, a nanohybrid, and a nanofill resin composite with that of a microhybrid composite in restorations of small occlusal cavities made in posterior teeth.

**MATERIALS AND METHODS:** Thirty-five patients, each with 4 occlusal restorations under occlusion, were enrolled in this study. A total of 140 restorations was placed, 25% for each material: an ormocer-based composite, Admira; a nanohybrid resin composite, Tetric EvoCeram; a nanofill resin composite, Filtek Supreme; and a microhybrid resin composite, Tetric Ceram. Two operators placed all restorations according to the manufacturers’ instructions. One week after placement, the restorations were finished/polished and patients were advised to return for follow-up at 6 months, 1 year, and 2 years. All patients attended the 2-year visit where the clinical performance of all restorations was evaluated. Two independent examiners made all evaluations according to the USPHS modified Ryge criteria immediately after placement of restorations and at subsequent recall visits. The changes in the USPHS parameters during the 2-year period were analyzed with the Friedman test. Comparison of the baseline scores with those at the recall visits was made using the Wilcoxon signed rank test. The level of significance was set at p < 0.05.

**RESULTS:** All materials showed only minor changes, and no differences were detected between their performance at baseline and after 2 years. Only one ormocer and one microhybrid composite restoration had failed after 2 years. No failure was detected in nanohybrid and nanofill composite restorations. Regarding the clinical performance, there were no statistically significant differences among the materials used (p > 0.05).

**CONCLUSION:** After 2 years, the ormocer, nanohybrid, and nanofill composites showed acceptable clinical performance similar to that of the microhybrid resin composite.

2- **Determining the Influence of Flowable Composite Resin Application on Cuspal Deflection Using a Computerized Modification of the Strain Gauge Method**

This study evaluated the influence of the application of flowable composite resin on cuspal deflection using a computerized modification of the strain gauge method. Forty sound extracted mandibular molars, which received a mesio-occlusodistal slot preparation, were divided into two groups of 20 molars each based on the type of restorative materials used. Each group was further divided into two subgroups of 10 molars each relative to the application of flowable composite resin at cavity internal line angles. Cuspal deflection was measured using a new computerized modification of the strain gauge method. The mean cuspal deflection values (µm/m) and standard deviations were calculated and subjected to normality and homogeneity of variances tests. If they passed the tests, they were subjected to parametric statistical analysis (independent sample t test). The results showed that groups containing flowable composite resin exhibited higher cuspal deflection values than groups without flowable composite resin. The application of flowable composite resin at the internal cavity line angles increased cuspal deflection, possibly due to the material’s high volumetric shrinkage levels, which exerted more stress at the tooth-restoration interface. Further, the validity of the new computerized modification of the strain gauge method was proven by the agreement
found between the output results and those of previous studies of cuspal deflection.