

**CUSPAL DEFLECTION IN PREMOLAR
TEETH RESTORED WITH A SILORANE
AND A DIMETHACRYLATE-RESIN
BASED COMPOSITE
(A COMPARATIVE STUDY)**

A thesis
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ABSTRACT

Cuspal deflection indicates residual stresses in the tooth structure, which may cause failure during composite curing or act as a preloading, facilitating tooth fracture under occlusal loads. It has been reported that placing resin composites in MOD cavities leads to inward deflection of the cusps. This study aimed to evaluate and compare the cuspal deflection between 2 low-shrinkage resin composites (Filtek™ Silorane) and (Tetric EvoCeram), and the effect of using light-cured GIC -Vivaglass® Liner- and storage in water on cuspal deflection at different periods of time.

Forty extracted maxillary first premolars of approximately similar sizes were prepared with standardized MOD cavities. The sample teeth which were then divided into two main groups (20 specimens each) according to the restorative material (group **A** Filtek™ Silorane and group **B** Tetric EvoCeram) and each group was subdivided into two subgroups (10 teeth each) according to the restorative technique.

Group A1: restored by low shrinkage Filtek™ Silorane with the placement of Vivaglass® Liner.

Group A2: restored only by low shrinkage Filtek™ Silorane composite resin.

Group B1: restored by low-shrinkage Tetric EvoCeram with the placement of Vivaglass® Liner.

Group B2: restored only by low-shrinkage Tetric EvoCeram composite resin.

All samples were restored with oblique incremental technique. The intercuspal distance was measured before and after the restorative procedures and after 1, 2 and 4 weeks of water storage and the difference was recorded as cuspal deflection.

Cuspal deflection was measured using digital micrometer. Data were analyzed statistically by ANOVA and least significant difference (LSD) test.

The results showed that Filtek™ Silorane group **A** significantly has less cuspal deflection. The placement of Vivaglass® Liner significantly reduced cuspal deflection with Tetric EvoCeram group **B**.

After four weeks water storage, cuspal deflection in all subgroups gradually decreased and shrinkage deformation reversed. Polymerization shrinkage deformation was almost compensated by hygroscopic expansion within 4 weeks. Cuspal deflections after water storage were highly significantly different with the two restoratives (**P<0.01**) . While light-cured glass ionomer cement has a non significant effect on cuspal deflection after 4 weeks.