

***The effect of low shrinkage dental  
composite on the fracture strength of  
weakened premolar teeth.  
(An in vitro study)***

*A Thesis*

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## *Abstract*

This in vitro study was conducted to evaluate and compare the cuspal fracture resistance of weakened maxillary premolar teeth with MOD preparations restored with different composite materials (A-filtek p60 packable , B- Tetric Evoceram , C-Filtek p90 Slornae) when submitted to occlusal load.

Fifty human adult maxillary premolar teeth recently extracted for orthodontic purpose were selected. These teeth received MOD cavity preparations with no proximal boxes. The teeth were then randomly divided in to five groups (n=10), according to the material used for restoration:

Group A : Teen teeth were not prepared (control group).

Group B : Teen teeth, with MOD cavity preparation were not restored.

Group C : Teen teeth, with MOD cavity preparation were restored with Filtek p60 packable composite .

Group D :Teen teeth, with MOD cavity preparation were restored with Tetric Evoceram nanohybrid composite.

Group E : Teen teeth, with MOD cavity preparation were restored with Filtek p90 silorane based composite.

These specimens were then stored in an incubator at 37°C for one week, at 100% humidity in deionized water before test.

Cuspal fracture resistance was determined using compressive testing machine and the statistical analysis of the results showed that there's a high significant improvement of the fracture resistant of restored teeth using posterior composite as compared to the unrestored ones, but; ther's no difference of the type of the posterior composite material used on the fracture resistance of the weakened teeth, while the sound teeth remained the strongest teeth compared with all the other groups.

The fractured specimens of group C(Filtek p60 packable composite ), group D (Tetric Evoceram nanohybrid) and group E (filtek p90 Silorane based composite) were then evaluated for the mode of failure using stereo microscope in order to explain and support the results of our study, the examination revealed that for Group C and group D,70%and 50% cohesive failure respectively while for group E 70% showed adhesive failure.