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**Fracture Resistance of Weakened Premolars
Restored With Different Preheated Bulk Fill
Composite Materials
(An *in vitro* comparative study)**

A thesis

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By

Othman Husham Abdulhameed
B.D.S.

Supervised by

Assist. Prof. Dr. Zainab M. Abdul-Ameer
B.D.S., M.Sc.

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Abstract

In this study, the effect of preheating of different bulk fill composite materials on the fracture resistance of the maxillary premolars was evaluated.

Sixty four caries and crack free maxillary first premolar teeth with two roots were extracted (within three months) for orthodontic treatments and subjected to special selection criteria were used in this study. These teeth were divided into five main groups (groups 3, 4 & 5 have subgroups) of eight teeth each: Group 1 (sound unprepared teeth), Group 2 (teeth received MOD cavity and left unrestored), Group 3-A (restored with Filtek TM bulk fill posterior restoration), Group 3-B (restored with preheated Filtek TM bulk fill posterior restoration), Group 4-A(restored with BEAUTIFIL –BUIK TM composite), Group 4-B (restored with preheated BEAUTIFIL –BUIK TM composite), Group 5-A (restored with Tetric EvoCeram® Bulk Fill composite) and Group 5-B(restored with preheated Tetric EvoCeram® Bulk Fill composite).The all experimental teeth were prepared with standardized MOD cavity except of group 1. The teeth in group 3, 4 and 5 restored with the composite materials according to the manufacturer's instructions and then subjected to the compression load with the long axis of the tooth until fracture by using universal testing machine. The data were statistically analyzed using one-way ANOVA test, LSD test and t-test. The specimens in groups 3, 4and 5 were examined to evaluate the mode of failure (adhesive, cohesive or mixed) by using a stereomicroscope at a magnification of (20X).

The control positive group showed the highest fracture resistance in comparison with all experimental groups ($P < 0.01$). The results of this study reveal the lowest fracture resistance in group 2 (prepared unrestored) compared with the restored groups. While, among restored groups, the teeth restored with BEAUTIFIL –BUIK TM composite recorded the highest fracture resistance as

compared with all other restored groups and the difference was statistically significant ($P<0.05$).

When using preheated composite materials, There were no statistically significant difference ($P>0.05$) between the restored groups.

There were no statistically significant difference ($P>0.05$) between the subgroups (at room temperature and preheated composite) except in group 5, there was a statistically significant difference ($P<0.05$) between group 5-A (at room temperature) and group 5-B (at $54\pm 1^{\circ}\text{C}$).

In conclusion, the teeth restored with BEAUTIFIL –BUIK TM composite material reveal the highest fracture resistance at room temperature and at $54\pm 1^{\circ}\text{C}$, and the preheating effect only in Tetric EvoCeram® Bulk Fill and there was a statistically significant difference ($P<0.05$) in comparison with that at room temperature.