

***Fracture Resistance of Weakened Premolar
Teeth Restored With Different Composite
Materials and Techniques***

(An In Vitro Study)

A thesis

***Submitted to the council of the College of Dentistry at the
University of Baghdad in Partial Fulfillment of the
Requirements for the Degree of Master of Science in
Conservative Dentistry***

By

Shamma`a Anees S. Al Ansary

B.D.S

Supervised by

Prof. Dr. Ali H. Al – Khafaji

B.D.S., M.Sc. D. (U.K)

April / 2009

Rebe`e Al-Thani / 1430

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 Z250 microhybrid. B – Filtek P60 packable and Filtek Z350 flowable*) using two types of application techniques (*A – incremental successive cusp build up. B – bulk-cured*) when submitted to occlusal load.

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

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

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

Group C: Ten teeth, with MOD cavity preparation were restored with *Filtek Z250* universal microhybrid composite resin with *Adper Single Bond2* bonding agent, using incremental successive cusp build up technique.

Group D: Ten teeth, with MOD cavity preparation were restored with *Filtek P60* packable composite with *Filtek Z350* flowable composite, using *Adper Single Bond2* bonding agent and incremental successive cusp build up technique as a restorative technique.

Group E: Ten teeth, with MOD cavity preparation were restored with *Filtek P60* packable composite with *Filtek Z350* flowable composite, using *Adper Single Bond2* bonding agent and Bulk-cured as a restorative technique.

II

These specimens were then stored in an incubator at 37C° for one week, at 100% relative 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 resistance of restored teeth using posterior composite as compared to the unrestored ones, but; there's no difference of the type of the posterior composite material used on the fracture resistance of the weakened teeth, nor the type of the packable placement technique used, while the sound teeth remained the strongest teeth compared with all the other groups.

The fractured specimens of groups C (Z250 microhybrid / incremental), D (P60 packable / incremental), and E (P60 packable / bulk) 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 D 70% showed cohesive failure while for group E 60% showed adhesive failure .

III