

## **A comparison of the effect of three direct composite resin restoration techniques on the fracture resistance of endodontically treated maxillary premolars**

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### **Abstract**

**Background and Aim:** Failure of restored teeth after endodontic treatment is one of the challenges faced in restorative dentistry. Premolar teeth are more likely to fracture due to exposure to tensile stress and inappropriate anatomical shape. Therefore, the aim of this study was the comparison of the fracture resistance of maxillary premolars which were restored with composite resin, composite resin with glass ionomer lining and composite resin reinforced with fiber post.

**Materials and Methods:** In this experimental study, 60 extracted human maxillary premolars were randomly divided into 4 groups of 15: Composite resin without bonding (1), Composite resin+ glass ionomer lining (2), Composite resin+ single bond 2 (3) and Composite resin+ Fiber post (4). The teeth were prepared by MOD design with palatal cusp reduction. The samples were placed in a chewing simulator and went under a 30 N force for 1200000 cycles. The threshold of compressive resistance was measured in MPa. Also, fracture patterns were assessed divided by restorability and non-restorability. ANOVA test was used for statistical analysis of data in all groups and post-hoc TUKEY test was used for two by two comparisons.

**Result:** The threshold of force resistance significantly increased from group 1 to 4 and the difference among all groups was strongly significant ( $p = 0.000$ ). Restorable fracture pattern followed an ascending order from group 1 to 4 which was reversed for unrestorable pattern with no significance. ( $P > 0.05$ )

**Conclusion:** Composite resin restoration reinforced with fiber post can increase the fracture resistance of endodontically treated premolars but the number of unrestorable fractures also increases with the use of these posts. Fracture strength and fracture patterns obtained through usage of composite resin restorations in endodontically treated teeth are appropriate.

**Keywords:** *Composite Resins, Dentin-Bonding Agents, Glass Ionomer Cements, Post and Core Technique, Stress, Fractures*