Fracture Resistance and Repairability of Six Restoration Methods of Endodontically Treated Maxillary Premolars

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Introduction: Reconstruction of hard dental tissue after endodontic treatment is a difficult and important duty of the dentist. According to the general opinion, endodontically treated teeth are inferior in quality, more brittle, predisposed to fractures and crackings. The aim of the present study was to compare the fracture resistance of endodontically treated maxillary premolars including MOD cavities with different restoration methods

Materials & Methods: Ninety intact extracted human maxillary premolars were assigned to six different restoration methods. After endodontic treatment, MOD cavities with \( \frac{2}{3} \) inter cuspal distance was prepared and restoration was carried out by one of the following methods: Group I: Buccal and palatal cusps were reduced 2mm and were restored with indirect composite onlay. Group II: The cavity preparation was same as group I, and then were restored with porcelain onlay. Group III: Reduction of palatal cusp was done as much as 2mm. One semihorizontal threaded pin was placed in buccal cusp and then was restored with amalgam. Group IV: The cavities were prepared same as group III and were restored with posterior resin composite. Group V: The MOD cavities were restored with amalgam. Group VI: The cavities were restored with posterior composite. The teeth in all groups were subjected to thermocycling and mechanical loading. Then all specimens were loaded to failure with static force in a universal testing machine at 0.5 mm/min. The mode of fracture was determined using a stereomicroscope and classified according to 3 categories, cohesive failure of tooth, and cohesive failure of restoration and mixed. Data were analyzed with ANOVA and Tukey test (\( \alpha \)=0.05).

Results: ANOVA showed significant differences among groups (\( P<0.001 \)) Tukey test found that the highest fracture resistance were in groups I, II, IV. The most unfavorable fracture site was occurred in group 1.

Conclusion: Endodontically treated maxillary premolars with wide MOD cavities could be successfully restored by indirect composite and porcelain onlay and semihorizontal threaded pin plus composite.

Key words: Horizontal pin, fracture resistance, endodontically treated teeth, amalgam, resin composite.

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