Survival Rates from Fracture of Endodontically Treated Premolars Restored with Full-coverage Crowns or Direct Resin Composite Restorations: A Retrospective Study

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Abstract

Introduction: The aim of the present study was to compare the survival rates against fracture of premolar endodontically treated teeth (ETT) restored with resin composite or crowns and to identify risk factors associated with the fracture. **Methods:** Data from dental records and radiographs of premolar ETT with postendodontic restorations (ie, resin composite or crowns) were collected between 2012 and 2016 and selected following selected inclusion and exclusion criteria. Tooth location, type of restoration, number of proximal contacts, and amount of tooth surface loss were recorded. The incidence and restorability of postendodontic fractures were identified. Survival rates against fracture of the 2 restoration types were calculated using Kaplan-Meier survival analysis. Any potential factors associated with fractures were identified using Cox proportional hazards models. **Results:** The survival rate against fracture of ETT restored with crowns (95.1%) was higher than resin composite (77.0%). ETT restored with resin composite with 1 or 2 tooth surface losses and 2 proximal contacts had a high survival rate of 88.5% that was not significantly different from ETT with crowns. A higher incidence of restorability after fracture was observed in teeth restored with resin composite than crowns. The type of restoration and number of proximal contacts were identified as potential risk factors associated with fracture incidence. **Conclusions:** The survival rate against fracture of ETT restored with crowns was higher than resin composite. However, ETT with 1 or 2 tooth surface losses and 2 proximal contacts and restored with resin composite showed a high survival rate that was comparable with ETT restored with crowns. *(J Endod 2018;44:233–238)*

Key Words

Endodontically treated teeth, full-coverage crown, resin composite, survival rate, tooth fracture

Significance

For survival from fracture, endodontically treated premolars with no more than 2 surface coronal structure losses and 2 adjacent teeth can be restored successfully with either a crown or resin composite as determined at the 5-year recall.

Fracture of tooth structure is a concern for endodontically treated teeth (ETT), especially in the posterior region. ETT are weakened from carious lesions, preexisting large restorations, or improper restorative procedures (1, 2). Tooth fracture usually occurs when ETT are not immediately restored, which can lead to coronal bacteria leakage or an unrestorable fracture (3, 4). The success rate of ETT with permanent restorations was significantly higher than those with temporary restorations (5, 6). For this reason, a permanent restoration should be placed as soon as possible after the completion of endodontic treatment.

As a protective concept, posterior ETT should receive a cuspal-coverage crown restoration to protect the tooth from fracture (7, 8). Several clinical studies reported that cuspal-coverage restorations significantly improved the success rate of posterior ETT by reducing the chance of postendodontic fracture (8–10).

As a conservative concept, posterior ETT with minimal to moderate loss of tooth structure can be restored with direct resin composite as the final restoration (7). *In vitro*, a high fracture resistance of ETT restored with resin composite was reported (11, 12). This concept is supported by the result of a randomized controlled trial. In this clinical study, the success rate of the premolar ETT at 3 years with 1 or 2 proximal surface losses and restored with fiber posts and resin composite was as high as those restored with crowns (13). However, the longevity of resin composite restorations in ETT with moderate to severe loss of tooth structure is questionable (14). The concepts of suitable postendodontic restoration in posterior ETT (conservative or protective approach) (15) are still controversial.

Therefore, the purpose of this study was to compare the survival rates against fracture of premolar ETT restored with either non–cuspal-coverage resin composite or cuspal-coverage crowns using a retrospective cohort design. In addition, the potential risk factors associated with the fracture were identified.

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