

The Effects of Cervical Lesion, Endodontic Access, and Resin Composite Restoration to the Fracture Resistance and Fracture Pattern of Maxillary Premolars

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Abstract

Deep cervical lesion is one of the bacterial tracts that can cause pulpal infection. Although, most endodontically treated posterior teeth are susceptible to fracture due to marginal ridge loss, it is doubtful about the effect of deep cervical loss to fracture resistance and the proper restoration for these teeth. This study investigated the effect of wedge-shaped cervical tooth loss and/or endodontic access and resin composite restoration on the fracture resistance and fracture pattern of maxillary premolars. Sixty-five intact extracted upper premolars were divided into 5 groups (n=13) with different amounts of tooth structure loss: 1) Intact tooth (IT), 2) Cervical lesion (CL), 3) Endodontic access (EA), 4) Cervical lesion and Endodontic access (CLEA), and 5) Cervical lesion, Endodontic access, and Resin composite restoration (CLEAR). Each specimen was vertically loaded on its occlusal surface using a universal testing machine until fracture occurred. Fracture resistance was analyzed using One-way analysis of variance, followed by the Tukey HSD test ($\alpha=.05$). The fracture patterns were determined by visual inspection. The EA and CLEA group presented significantly lower fracture resistance than the IT groups. The fracture resistance of The CLEAR group was not significantly different from that of the IT group. Most teeth in the IT, CL and CLEAR group fractured above cemento-dentinal junction (CEJ) but in the EA and CLEA groups, fracture under CEJ were prevalent. In conclusion, endodontic access significantly reduced the fracture resistance of maxillary premolars, especially when combined with a cervical lesion. Resin composite restoration increased the fracture resistance to approximately that of the intact tooth.

Keywords: Cervical lesion, Endodontic access, Fracture resistance, Maxillary premolar, Resin composite

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