Abstract
AIM: This study aimed to compare the fracture resistance and fracture modes of ceramic onlay restorations with or without fiber posts in endodontically treated premolars.

MATERIAL AND METHODS: Fifty extracted human premolars with similar anatomic features were used in this study. Four groups (n = 10) were treated endodontically. Onlay cavities extended to the buccal and palatal cusps and reached out the endodontic accesses were prepared. Ceramic onlay restorations with or without fiber posts were categorized as Group CO (ceramic onlays without posts), Group COQF (ceramic onlays and quartz fiber posts), and Group COGF (ceramic onlays and glass fiber posts). Positive control group was left as non-restored (Group NR). Ten intact teeth were stored as negative control group (Group IT). Fracture resistance was measured using a universal load-testing machine applying compressive load at a crosshead speed of 1 mm min(-1) until fracture. Fracture resistance and modes were evaluated statistically.

RESULTS: Ceramic onlay restorations (Groups CO, COQF, COGF) increased the fracture resistance significantly, when compared with non-restored teeth (P < 0.05). However, no significant differences were found in the groups with fiber posts in terms of fracture resistance (P > 0.05). Negative control group (IT) had significantly higher fracture resistance than all others (P < 0.05). Fracture types had significant differences among the groups (P < 0.01).

CONCLUSIONS: Within the limitations of this ex-vivo study, partial coverage with ceramic onlays resulted in a significant improvement of the fracture resistance of endodontically treated premolars. However, insertion of glass or quartz fibers did not increase the fracture resistance significantly.

KEYWORDS: IPS Empress 2; ceramic onlays; fiber posts; fracture strength; glass fiber; quartz fiber

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