IN VITRO FRACTURE RESISTANCE OF ENDODONTICALLY TREATED CENTRAL INCISORS WITH VARYING FERRULE HEIGHTS AND CONFIGURATIONS.

INTRODUCTION

The restoration of the endodontically treated tooth is an important aspect of successful endodontic therapy. There are wide ranges of treatment options of varying complexity. The clinician must be able to predict the probability of restoring such teeth successfully. (1) Generally, endodontically treated teeth experience significant coronal destruction as well as loss of radicular dentin, due to the removal of tooth structure during endodontic access opening and post-space preparation. Clinical longevity of post-and-core restoration can be influenced by many factors, including the magnitude and direction of the occlusal load, design of the dowel, thickness of the remaining dentin, quality of the cement layer and creation of ferrule effect to enhance the structural durability of the final restoration.(1,2)

MATERIALS AND METHODS

48 intact maxillary central incisor teeth were selected from the Department Of Oral Surgery (Institute Of Dental Sciences, Bareilly, U.P.) Working length was set at 1 mm short of the apical foramen. Canal preparation was completed by using a step back technique with K-files. Obturation was accomplished by cold lateral condensation with gutta percha and AH-26 sealer. Reduction guides were made from vinyl polysiloxane putty.

Dowel space preparation began with the removal of gutta percha using a heated plugger. Final gutta percha removal was performed with peesoreamers, taking care to preserve 4 mm of apical gutta percha. The apical region of the dowel space was prepared with a drill. Dowel-and-core patterns were made from blue inlay wax to replace the coronal dentin that had been removed. Pattern from each of the groups was invested with uniform and non uniform ferrule configurations. The restoration of the endodontically treated tooth is a unique and complex procedure. Several criteria have been put forward for the evaluation and treatment planning of final restoration for endodontically treated teeth. The clinician must consider the advantages and disadvantages of saving teeth according to their eventual role in restoring occlusion, function and esthetics. Root fracture of endodontically treated teeth restored with post and core is a common problem. So this study was conducted to evaluate the efficacy and comparison of uniform and non uniform ferrule designs in preventing the root fracture. This in vitro study investigated the resistance to static loading of endodontically treated teeth with uniform and non uniform ferrule configurations.

ABSTRACT

Restoration of endodontically treated teeth is a unique and complex procedure. Several criteria have been put forward for the evaluation and treatment planning of final restoration for endodontically treated teeth. The clinician must consider the advantages and disadvantages of saving teeth according to their eventual role in restoring occlusion, function and esthetics. Root fracture of endodontically treated teeth restored with post and core is a common problem. So this study was conducted to evaluate the efficacy and comparison of uniform and non uniform ferrule designs in preventing the root fracture. This in vitro study investigated the resistance to static loading of endodontically treated teeth with uniform and non uniform ferrule configurations.

KEYWORDS

Post & core; Dowel; Ferrule; Crown

RESULTS

• Figure summarizes the findings of the investigation. Significant differences were detected by...
DISCUSSION

Post endodontic restoration is very important for the clinical success of the endodontically treated tooth. Endodontically treated teeth have significantly different physical and mechanical properties when compared to vital teeth. It has been assumed that endodontically treated teeth are brittle and more prone to fracture because of loss of water. But the exact phenomena occurs due to the disorganization and change in the collagen structure of the dentin and incorporation of tensile stresses. So the successful restoration of root filled teeth requires an adequate coronal seal, protection of the remaining tooth, while restoring function and acceptable aesthetics. A crown, a cast indirect post and core may be required to replace missing tooth structure and provide retention for the restoration.

The magnitude of the difference in failure load between the teeth with a uniform 2-mm ferrule and teeth with a nonuniform ferrule was surprising. This difference in failure load is attributed to the difference in remaining coronal tooth structure. The ferrule is a band that encircles the external dimensions of the residual tooth. It is formed by the walls and margins of the crown or by cast telescopic coping encasing at least 2 to 3 mm of sound tooth structure.

The crown and crown preparation must have 5 requirements: (5)
1) The dentin axial wall height must be at least 2 to 3 mm.
2) Axial wall must be parallel.
3) The restoration must completely encircle the tooth.
4) The margins must be on sound tooth structure.
5) The crown and crown preparation must not invade the attachment apparatus.

CONCLUSION

The following conclusions were drawn:
1. The mean fracture strengths of endodontically treated maxillary central incisors restored with a crown without a dowel and endodontically treated maxillary central incisors restored with a cast dowel and core and crown with a uniform 2-mm ferrule were not significantly different.
2. Endodontically treated maxillary central incisors with a uniform 2-mm ferrule were more fracture resistant than those with a ferrule varying between 0.5 mm and 2 mm (P=.0001).
3. Endodontically treated maxillary central incisors with a ferrule length varying between 0.5 mm and 2 mm were more fracture resistant than those without a ferrule (P=.001).

REFERENCES