

## ADHESIVELY RETAINED FIBER REINFORCED COMPOSITE POST AND CORE VERSUS TRADITIONAL POSTS AND CORES: ITS FRACTURE RESISTANCE, STIFFNESS AND FAILURE CHARACTERISTICS MODES

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### ABSTRACT

**Statement of Problem:** Post and core foundation restoration are often required as it provided retention and resistance for endodontically treated teeth against potentiality for risk of distortion and fracture.

**Purpose:** This in vitro study examined the effect of post and core build up material type and properties on stiffness, fracture resistance, fatigue loading and failure characteristic modes of endodontically treated teeth under mechanical aging by cyclic loading.

**Material and Methods:** Forty human mandibular molars teeth were decoronated at cemento-enamel junction, endodontically treated then their distal canals were prepared for post fixation. The prepared teeth were divided equally into 4 groups according to type of post system as follows (n=10):

- Group 1: casted post and core build up.
- Group 2: Prefabricated threaded titanium post and amalgam core.
- Group 3: Fiber reinforced composite post and composite resin core.
- Group 4: control group-endodontically treated teeth with no post and core.

A continuous cyclic load (5000 N) was applied at a cross head of 5 mm/min until failure happened; collected data were subjected to 1-way analysis of variance and Tukey multiple comparison test was also performed to establish which groups were statistically different from the others at alpha equal to 0.05. The pattern mode of failure was classified as repairable or nonrepairable.

**Results:** The ANOVA test of this study detected statistical significant difference in fracture resistance among the four tested groups as  $P=0.0001$ .

Pairwise Tukeys multiple comparison test revealed statistical significant differences between all paired groups ( $P<0.05$ ) except between composite and amalgam groups where the difference was statistically non significant ( $P>0.05$ ). The ANOVA Test detected statistical non significant difference in stiffness among the four groups ( $P>0.05$ ).

**Conclusion:** Within the limitation of this investigation post and core build up material type affected the fracture resistance and failure mode of endodontically treated teeth. The traditional cast posts and cores were stronger than adhesively retained fiber-reinforced resin type regarding its significantly high fracture resistance but pattern mode of failure were unrepairable radicular or coronal radicular for traditional type which was not preferable, but adhesively fiber post with composite core exhibited lower fracture resistance values but it was repairable coronal failure fracture mode which considered as preferable one.

**Clinical Implication:** The dental clinician is now faced with a variety of choices when restoring an endodontically treated tooth with a substantial loss of enamel and coronal dentin. Does dental clinician go for traditional posts and cores or an adhesively retained fiber post and composite core? This study will answer this important question.

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