aedj.2014.6.4.1.2

RESTORATION OF THE ENDODONTICALLY TREATED TOOTH WITH THREE DIFFERENT POST SYSTEMS - AN *IN VITRO* STUDY

[1] Lenin Babu Thota [1] Senior Lecturer
[2] Gunaranjan [2] Senior Lecturer
[3] Vamsee Krishna N [3] Senior Lecturer

[1,2] Department of Conservative Dentistry and Endodontics, Narayana Dental College, Nellore, Andhra Pradesh, India.
[3] Department of Conservative Dentistry and Endodontics, Mamata Dental College, Khammam, Telangana, India.

ABSTRACT : Endodontically treated teeth are significantly weaker and more prone to fracture. The reasons are desiccation or premature loss of moisture supplied by a vital pulp. The posts have been advocated to strengthen weakened endodontically treated teeth against intraoral forces by distributing torquing forces within the radicular dentin to support tissue along their roots. This in vitro study compared the effects of three post systems on the fracture resistance of endodontically treated teeth.

KEY WORDS: Endodontic, Fracture, roots, Post.

INTRODUCTION

The goal of endodontic and restorative dentistry is to restore endodontically teeth of its missing tooth structure, maintain function, esthetics and protect it against fracture and infection[1,2,3]. Posts were used in restoration of endodontically treated teeth for more than one hundred years. In the past wooden pivots were used as post to often reinforce the tooth structure, due to their drawbacks such as reinfection, Cast post and core the treatment of choice for restoration of endodontically treated teeth.[1,] Since endodontically treated teeth require special consideration the physical properties of the posts gained a lot of importance. The posts should have a good bonding ability, better retention and aid in stress distribution all of which aid in reinforcement the tooth structure[1,4]. Since the cast post and core does not have good bonding ability and is more prone to corrosion, its elasticity is different from the tooth structure producing stress and the potential of root fracture[7]. These overall drawbacks lead to the development of the composite posts systems that have a good bonding ability to dentin. These posts can reinforce the tooth and share elasticity similar to that of dentin. As the remaining tooth structure decreases, the functional need increases, so great care is needed for restorative planning[1,7]. The present study compares the cast post systems with various other root reinforcement procedures.

AIM OF THE STUDY: To evaluate and compare the fracture resistance of endodontically treated tooth restored with three different post systems.'

METHODOLOGY

Thirty extracted human central incisors were selected and examined visually and radiographically to avoid teeth with caries and other abnormalities further décor nation of all the crowns upto 2mm below CEJ followed by working length determination and Bio-mechanical preparation upto 60 size K-File, followed by obturation done under lateral compaction method. Leaving 4mm of Guttapercha apically, the post space preparation was carried out with the help of drills. Finally the teeth were restored with 3 different types of posts. Group–1 :(Control group) Narrow canals with glass fiber posts. Group -2: Flared canals with custom made posts. Group -3: Flared canals with Indirect composite post. Glass fibres post used are commercially available along with drills. Custom made post fabricated with the help of wax pattern. The indirect composite post was fabricated with material being rolled on to a glass slab then initially cured followed by increments added on to the obtained post. Finally, the obtained post is placed in the furnace for further polymerization. All the posts were cemented with Rely-X dual cure resin cement. All the samples received composite core buildup. The samples were subjected to universal testing machine at an angle of 45^0 to the long Axis of the tooth failure modes were recorded and then subjected to statistical analysis (one way ANOVA and TURKEY tests Variance).

Fig.1. GROUP-I (Glass Fibre Post Luted with Resin Cement)

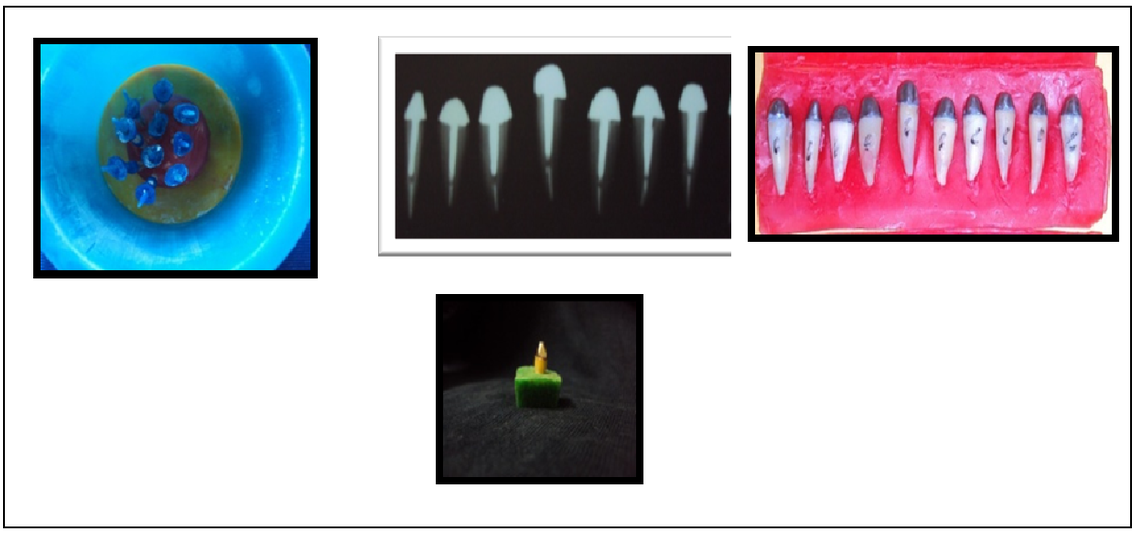
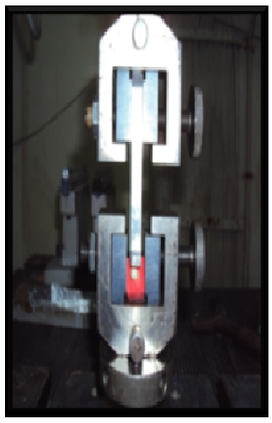


Fig.2. GROUP- II (Custom Made Post Luted with Resin Cement)

Fig.3. GROUP-III (Indirect Composite Post Luted with Resin Cement)



Fig,4, Specimen subjected to universal testing machine

RESULTS

The samples restored with Glass fiber posts showed greater resistance to fracture when compared to cast post and core and Indirect composite posts. Likewise there were no statistical significant differences between cast post andcore and indirect composite posts.

DISCUSSION

During the past decades there has been an increased interest in restoring endodontically treated teeth .[1,3]This mode of treatment is complicated by the fact that much or all of the coronal tooth structure which normally would be used in the retention of the Restorations has been destroyed by caries, previous restorations, trauma and the endodontic access itself.[1,2,4] The endodontic treatment changes the actual composition of the remaining tooth. The result of this treatment leads to the common clinical findings of increased Susceptibility to fracture and decreased translucency.[4,10,11] In the present study three types of post systems were considered. The glass fiber post systems offered highest resistance to fracture than the cast post systems. In search for factors that support these results. The higher fracture resistance was attributed to the un-polymerized form in which these posts are supplied, which allows the resin monomer at the surface to react well with monomer in the resin cement for better bonding ability. Penetration of bonding resin did not occur with the metal post.[8,12,13] The modulus of elasticity being high with the metal post systems when compared to the other post systems exhibiting similar modulus of elasticity to dentin,[13] allowed these posts to absorb forces and transfer it along the root, which protects the tooth from fracture.[8,12,13] One of the drawbacks associated with the

metal post being rigid, the juxtaposed nature of the posts to the dentinal walls resulted in distribution of forces directly on the walls resulting in un-repairable root fractures.[6,14,] These over all factors contributed to the decreased resistance to fracture of cast post and core groups. The reason indirect composite posts could be an alternative to the cast post and core is that cast post and core requires multiple visits and a laboratory for processing. Whereas indirect composite posts require short duration of time. Esthetics could also be a cause of concern. The unrestorable fracture associated with the metal posts is another drawback.[4,13]

CONCLUSION

Higher resistance to fracture was observed with the fibre posts when compared to other groups, furthermore fractures were amendable to repair with the fibre post when compared to custom made posts. Therefore, fiber post can be preferred when compared to cast postand core systems. Also, the composite post offers an alternative to the cast post systems regarding esthetic needs.

References:

1. Cohen S, Burns R.C. Pathways of the pulp, 8th edition, PB Harcourt (India) Pvt. New Delhi 765-72.
2. Albert C.G. Management of Endodontically Treated Teeth. Part-I: Concepts for Restorative Designs. *J Prosthet Dent* 1983; 49(3): 340-45.
3. Saeed R. Invitro comparison of three different lengths of remaining gutta- percha for establishment of apical seal after post-space preparation. Journal of Oral Science, Vol. 50, No. 4, 435-439, 2008.
4. Dorothy McComb. Restoration of the Endodontically Treated Tooth. PEAK. February/March 2008
5. Steven M.M. Foundation restoration in fixed prosthodontics: Current Knowledge and future needs. *J Prosthet Dent* 1999; 82: 643-54.
6. Lawson W.S. Factors affecting retention of post systems: A Literature Review. *J Prosthet Den* 1999; 81(4): 380-85.
7. Schwartz R.S, Robbins J.W. Post placement and restoration of endodontically treated teeth. *J Endodon* 2004; 30(5): 289-99.
8. Sirimai S, Riis D.N and Morgano S.M. An in vitro study of the fracture resistance and the incidence of vertical root fracture of pulpless teeth restored with six post-and-core systems. *J Prosthet Dent* 1999; 81(3): 262-69.
9. Fraga R.C, Chaves B.T, Mello G.S.B and Siqueira J.R. Fracture resistance of endodontically treated roots after restoration. *Rio de Janeiro, Brazil* 1998; 25: 809-13.
10. Akkayan B, Dent D and Gulmez T. Resistance to fracture of endodontically treated teeth restored with different post systems. *J Prosthet Dent* 2002; 87(4): 431-37.
11. Carla C. Restoration of endodontically treated teeth. Jul-Sep;8(3):e33-46.
12. Thanjal. 0ptimisation of interfacial bond strength of glass fibre endodontic post systems.
13. Reem Al-Dhalaan. Prosthodontic management of endodontically treated teeth.
14. AL-Omiri.Fracture resistance of the restorated with post-retained restoration.JOE, vol 36, number 9,

Corresponding Author

Dr.**Lenin Babu Thota** M.D.S,
Senior Lecturer
Department of Conservative Dentistry and Endodontics, Narayana Dental College,
Nellore, Andhra Pradesh, India
Email: thotaleninbabu@gmail.com