

CASE REPORT

USE OF CUSTOM FIBER POST FOR A FLARED CANAL – A CASE REPORT

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ABSTRACT

Choosing between the traditional post and custom fiber post for a flared canal requires careful consideration of various factors, including the specific needs of the patient, aesthetic demands, mechanical requirements and clinical expertise. While both systems can achieve successful outcomes, a personalized approach based on the individual is crucial. The presented clinical case demonstrates the decision making process and treatment protocols associated with custom made fiber post providing valuable guidance for flared canal cases.

Keywords: Anatomic fiber post, flared canal, composite resin

INTRODUCTION

Endodontists are often faced with situations where anterior teeth are extensively destroyed due to caries or trauma and also exhibit a flared root canal. Endodontic treatment and coronal rehabilitation to provide a stable, long term function and esthetics is highly challenging in such cases. Wide post and wide root canal preparation make the root fragile which may result in failure or fracture of the tooth. (rigidity and wedging effects).

Fiber post is the latest alternative to cast post because of its Esthetic appearance, Compatibility with the composite core, Lower modulus of elasticity and Better distribution of stresses makes them the ideal choice for anterior esthetic rehabilitation. Reasons for failure of fiber post- The most common cause for failure of fiber post in flared canals is debonding. (*Fredriksson et al 1998, Scotti et al 2002*) If post is not well fitting especially at the coronal level, the cement layer is too thick with presence of voids within, predisposing to debonding. (*Ferrari et al 2000*)

Recent innovation is “CUSTOM/ANATOMIC FIBER POST”- Adaptation of composite resin over the fiber post. A boon for the flared canal. The first documented attempt to make anatomic fiber post was by Ferrari et

al 2002 by relining a glass fiber post with CR. Advantages include Intimate adaptation like the cast post and Post is bonded to the canal which minimizes chances for root fracture.

The present case report discusses the clinical steps in the fabrication of a direct custom made fiber post and core for successful management of an extensively damaged anterior tooth.

CASE STUDY

CASE 1

A 30-year-old male patient came with a chief complaint of discoloured and fractured maxillary front tooth. History of previous root canal treatment for 21 was given by the pt. Radiographic examination showed inadequately obturated canal and periapical lesion was present in relation to 21. The root canal also seemed to be excessively flared. After clinical and radiographic examination, it was decided to do the retreatment of the tooth and fabricate a custom made fiber post as part of the post endodontic restoration.

After completion of the retreatment, Peeso reamers (MANI, Japan) were used to prepare the post space. A size 4 glass fiber post was chosen but it was poorly fitting in the canal. Hence the decision was made to fabricate custom made post to provide anatomic adaptation. Glycerine was used as separating medium and coated in the canal. The selected fiber post was treated with silane (Ultradent, USA) for 1 minute. A nano hybrid composite (Tetric N Ceram, Ivoclar Vivadent USA) was adapted to the post and then seated in the canal to reproduce the canal anatomy. The custom fiber post was light cured inside the canal for 20 seconds followed by extra oral curing for an additional 20 seconds. Following this, the core build up was done using composite and fabricated post and core was checked for proper fit. Prior to cementation, the canal was thoroughly rinsed with 5ml of 17% EDTA for 1 minute to remove the smear layer. Conditioning was done using 37% phosphoric acid gel (Ivoclar Vivadent) for 15 seconds followed by rinsing and drying of the canal. The two step etch and rinse adhesive system (Tetric-N-Bond, Ivoclar Vivadent) was coated into canal

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thoroughly and excess was removed using a paper point. This was then light cured for 20 seconds. The canal and the post surface was coated with a dual cure resin luting cement (Rely-X U200, 3M ESPE) and the post was firmly seated into the canal and light cured for 20 seconds on all margins. Excess cement surrounding the post and core was removed.

CASE 2

A 25-year-old male patient came with a chief complaint of fractured maxillary front tooth. History of previous root canal treatment for 21. Radiographic examination showed adequately obturated canal. As pt was asymptomatic and flared canal was present, it was decided to proceed with anatomic fiber post. Post space preparation was done using peeso reamers leaving 3-4mm of GP at the apical third. Same steps were followed for the fabrication and cementation of custom post as in previous case.



Preoperative clinical view



Fiber post cementation done



Preoperative radiograph showing inadequately obturated root canal



Post obturation radiograph



Postoperative radiograph



Postspace preparation radiograph taken



Anatomic post fabricated by adding composite to post



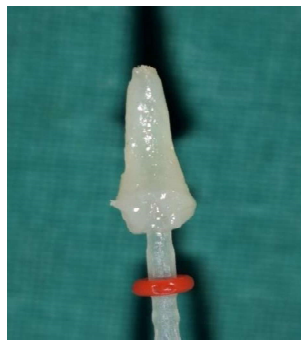
Crown cementation done



Preoperative clinical view



Postspace preparation radiograph taken



Anatomic post fabricated by adding composite to post



Post operative view

DISCUSSION

As wide canal was present in this situation, the decision was made to fabricate anatomic fiber post and core. The introduction of prefabricated esthetic fiber posts

has overcome most of the problems with cast posts. Modulus of elasticity closely matched with tooth and adhesive techniques increase bonding to the tooth structure. In flared canals there is an increased thickness of resin cement to fill in the space around the post- Post debonding is a problem because of the excess cement at the coronal region.

A new concept evolved in restorative dentistry with the introduction of fiber reinforced composite posts. Since they are more compatible with adhesive resins, luting resin cement and composite resin, they form a mechanically homogenous structural complex and this was referred to as the ‘Monoblock Concept’.

Light transmitting fiber post was introduced by Lui in the mid 1990s. Disadvantages of this technique includes Reduces the canal width to prefabricated fiber post dimensions, Insufficient curing at the deepest portion of the canal walls. The use of accessory posts has also been suggested protocol for restoration of flared canals along with the main fiber post. This can incorporate voids in between, which in turn reduces the adhesiveness of the posts to the canal.

Use of anatomic fiber post method ensures adequate curing at the deepest regions of the canal wall as the composite resin attached to the fiber post is first cured inside the root canal and can be further cured outside before the luting procedure. Anatomic posts will bend less under oblique loading than thinner posts by transferring the deformation stress down the root. Risk of root fracture due to wedging action under masticatory forces is avoided in anatomic post, unlike the cast metal post. Anatomic posts seem to be an effective method to improve the biomechanical behavior of flared root canal preparations. Laboratory analysis Showed similar fracture strength to that of metallic posts and superior strength to non relined fibre posts (Clavijo et al, Silva et al)

Confocal microscopic image of a fiber post cemented into a root canal by a conventional technique. a large void is evident within the cement layer.

Advantages of anatomic fiber post over other techniques includes Customization in a single visit without need for lab support, Minimal tooth structure removal, Intimate adaptation to canal shape, Minimal cement thickness, Decrease polymerisation shrinkage, Better chemical union with resin cement.

- Anatomic fiber post was chosen as a better option for this particular case keeping in mind the young age of the patient and the remaining dentinal thickness in the tooth.
- Customization of the fiber post was performed with a nano-hybrid composite which has improved

mechanical and physical properties than microhybrid composites.

- Silane pretreatment of the post was done to enhance bonding to the root canal walls.
- After one year follow-up evaluation, the anatomical fiber post and restoration demonstrated excellent clinical performance and no radiographic changes.
- There has been other clinical cases which have proved that this technique of using a anatomic post is successful after a four year follow up to prove the same.

CONCLUSION

Anatomical fiber post has emerged as the definitive option for reinforcing structurally weakened anterior teeth- custom shape and adhesive luting with resin cement provide optimal retention. - Important element in biomechanical performance of such teeth due to low MOE. The present report demonstrates the successful outcome of this protocol.

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