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Case Report

Post-Endodontics Restorations with Direct Anatomic Post: Case Report

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Abstract

Endodontically treated teeth with flared canals and weakened roots are challenging to restore, especially regarding the cementation line, which should favor retention with minimal amount of luting agent. Composite resin-relined fiberglass posts are the most viable option for such cases. An anatomic post (AP) was customized to optimize adaption into the root canal prior to cementation. A preoperative radiograph was taken for endodontic evaluation and planning. Rubber dam was placed and root preparation was performed after selection and adaptation of the Fiberglass Post (FP). The canal was lubricated with glycerin gel and the FP surface was treated for composite resin bonding, which was then applied onto the post and adapted to the canal walls. The resin was light-cured for 5 seconds, removed from the canal and light-cured for 60 seconds. The customized post was reinserted to ensure adaptation. The AP and the canal were prepared for cementation of the anatomic post. Once cemented, a composite core was built up, followed by preparation for a temporary crown for later replacement with a definitive restoration. The occlusion was checked as well as the esthetic requirements, such as shade, anatomy and patient preferences. In this case report, a rehabilitation technique using the AP approach was presented and discussed to show an alternative method to address teeth with flared canals and weakened roots, as an effective and easily applied strategy.

Keywords: *Anatomic Post; Fiberglass Post; Dental Esthetic; Operative Dentistry; Endodontics*

Introduction

Restoring fragile tooth roots is a great challenge in routine restorative dentistry [1]. In the past, the most viable form of rehabilitation for endodontically treated teeth was via cast metal posts [2]. It presented some disadvantages such as high cost, long clinical time, as well as wear and tear of already weakened tooth structure [3]. Metal posts may compromise esthetics when combined with metal free restorations [4,5]. Furthermore, the modulus of elasticity of cast alloys is much higher than that of the dentin, risking stress to the root, fracture and consequent tooth loss [6,7]. Roots may weaken due to recurrent caries in root dentin, excessive root instrumentation and pulpal necrosis prior to complete root formation in a young patient. Large root canals have thin dentin walls, which may leave them too weak to support masticatory loads and are more susceptible to fracture, making rehabilitation more complex [8].

Prefabricated post systems were developed to optimize working time and facilitate the operative technique itself. They also overcome some of the deficiencies of metal posts, as they are relatively inexpensive, easy to install, without the need for impressions and laboratory steps, thus allowing for a more conservative preparation due to a variety of shapes, sizes and materials available [9]. Because their modulus of elasticity is similar to that of the dentin, fiberglass posts tend to dissipate the masticatory forces minimizing the risk of fracture, thus allowing the construction of a mechanically homogeneous unit [5]. Because FB are translucent, they can be successfully used in situations of high esthetic demand [2]. Preparation of the remaining tooth, correct post selection and surface treatments are very important to the

success of the case. However, if post adaptation is not adequate, the cementation line could be thick, inducing the formation of bubbles and voids, which will adversely affect mechanical properties, e.g. stress contraction on fewer polymerized areas of the bonding interface and consequent restoration failure [10].

To solve such problems, post customization (anatomic post) using composite resin is a promising strategy, because it produces a retainer in the shape of the canal, which consequently reduces the cementation line and improves mechanical properties. The anatomical post technique allows minimal removal of the remaining dentin and strengthens the root internally, due to the chemical bond that results from the internal walls of the preparation to the materials applied to the canal [7]. The aim of the present case report was to describe a restorative technique using an anatomic post.

Case Report

An 18-year-old male presented to the undergraduate dental clinic of the Universidade Paulista, Brasília Campus complaining of a defective restoration in his upper left incisor. On intraoral examination, the tooth 11 presented with more than 50% coronal loss to caries and a temporary restoration. Radiographic examination revealed a satisfactory endodontic treatment (Figure 1). The treatment of choice was the anatomic post cementation strategy to enable rehabilitation of the tooth, which had a significant flared root canal.

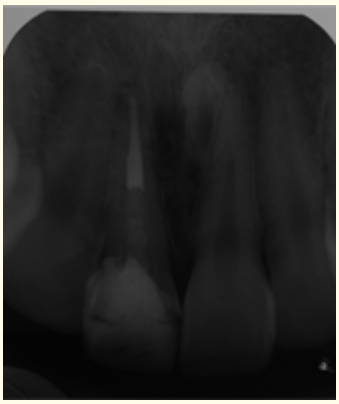

Figure 1: *Initial periapical radiograph.*

Root canal preparation was performed using a largo drill no 3 (Figure 2). The fiberglass post was selected (Exacto/Angelus, nº1) and customized with composite resin. The root canal was lubricated with glycerin aided by a microbrush (Figure 3).

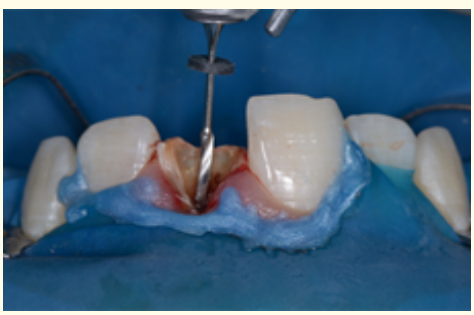

Figure 2: *Root canal preparation.*

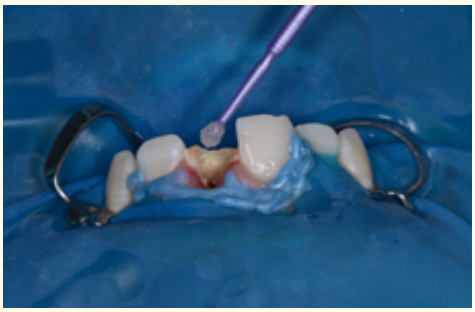

Figure 3: *Root canal lubricated with glycerin, applied using a micro brush.*

Post disinfection was carried out using 70% ethanol and silane was applied (Silano-Prosil/FGM), followed by the adhesive system (Scotchbond/3M) and light-curing (Radii-cal/SDI, 1200 mW/cm^2). Microhybrid composite resin A1 (Z250/3M ESPE) was accommodated onto the post surface to copy the inner aspect of the root anatomy (Figure 4).

Figure 4: *Composite resin accommodation onto the post surface.*

The unpolymerized resin block and fiberglass post were inserted into the canal and light-cured for five seconds. The block was removed and light-cured out of the mouth for further sixty seconds. To verify adaptation, the anatomic post was reinserted into the root canal.

With the anatomic post ready (Figure 5), the root canal was treated with 2% Chlorhexidine Digluconate, rinsed with running water and dried with absorbent paper points. RelyX U200 dual self-adhesive resin cement (3M/ESPE) was used for cementation. The luting agent was inserted into the canal using a dental probe applying manual vibration to minimize bubble formation and cementation voids. Some of the resin cement was also applied to the surface of the relined post prior to insertion into the root canal. A few seconds were allowed for initial chemical cure and light-curing followed suit for 1 minute. A composite core was then built up (Figure 6), prepared for a crown (Figure 7) and a temporary crown was made and fitted. Rehabilitation was therefore achieved in a single session, demonstrating the practicality and effectiveness of such an approach.

Figure 5: *Anatomic Fiberglass Post.*

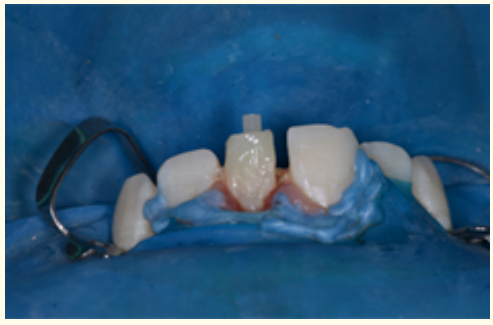

Figure 6: *Core build-up.*

Figure 7: *Finished preparation.*

Follow-up of the treatment should be clinical and radiographic. Clinically, the retention of anatomic post and crown should be evaluated and if it was capable to resist the masticatory forces without fracture or dislodgement of the root. Regarding the radiographic analysis, cervical adaptation of the crown, presence of fractures of the post system and integrity of the cement line must be observed.

Discussion

Anatomic posts made from translucent fiberglass covered by a layer of composite resin allows anatomical molding of the root canal aiming at optimizing adaptation of any prefabricated posts. As a result, precise adaptation to the root canal and a thin and uniform layer

of luting agent are possible to achieve, creating ideal conditions for post retention [11]. Several studies [12-15] corroborate that although it is a desirable technique for all cases, it is most effective when used in root canals with an elliptical cross-section, or those with very little remaining tooth structure after endodontic treatment.

In a clinical and radiographic six-years follow-up study with anatomic posts, Constâncio., *et al*. (2012) [16] reported that the teeth treated using this method remained stable, which was consistent with the assumptions of compatible tensile and compression strength, biocompatibility and adequacy of the restorative material, a thin luting cement line, all of which provided satisfactory esthetics at relatively low cost.

In clinical situations, such as the one presented herein, in which the root canal is flared, the fiberglass post reline technique is the most rational option, due to clinical practicality, restorative materials with modulus of elasticity close to that of the dentin and, when associated to metal-free crowns, do not adversely affect esthetics [17].

The luting agent used for this case was a self-adhesive cement without any pretreatment of the inner root surface, following the studies by Traitenberg., *et al*.[18] (2008) and Braz [19] (2016). These authors evaluated the stability and bond strength of different resin cements and demonstrated that self-adhesive resin cements presented stable bond strengths. The fiberglass post surface was, however, pretreated to improve the interaction root dentin/luting agent/anatomic post [14,15].

Conclusion

Anatomic posts allow conservative and effective restoration of endodontically treated teeth with flared canals and fragile roots. Among the advantages highlighted in this report, this technique may allow long-term stability of the tooth by restoring esthetics and function, when used correctly.

Conflict of Interest

The authors declare no conflict of interest regarding this clinical case and that it was carried out in the undergraduate dental clinic of the Universidade Paulista, Brasilia Campus.

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