Tips: Customized Glass Fiber Posts

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Why is it important?

As an alternative to the restorative treatment of endodontically treated teeth that exhibit fragile roots (dentin thickness of less than 1mm), wide canals or ovoid and remaining coronary structure smaller than 2mm, customized glass fiber posts can be used[1, 2].

Significant improvement in the adaptation and retention of fiber posts can be achieved through modeling of glass fiber posts. A layer of composite resin is applied to the surface of the post to create the proper format of the root canal. Thus, the fiber post reproduces the root canal morphology of the tooth that will receive the future prosthetic restoration[1, 3, 4, 5].

Once the anatomical post it is adjusted to the shape of the canal, a thin and uniform layer of resin sealer is required. Decrease in thickness of the sealer line creates uniformity in the distribution of occlusal forces transmitted to the tooth, reduces polymerization contraction effect of resinous material, as well as the number and size of the bubbles in the polymerized sealer[1, 4, 5, 6].

Customization of glass fiber posts provides advantages from traditional fused metal core, such as the possibility to adapt to internal root walls, and from the glass fiber posts themselves, such as esthetics, modulus of elasticity similar to dentin, reducing risks of irreversible root fractures, irreversible and less wear of the healthy dental structure[7, 8, 9].

What is required?

- ***Glass fiber posts and burs with corresponding thicknesses***
- ***Light-curing Composite Resin***
- ***Largo Burs***
- ***Millimeter Ruler***
- ***Overhead projector pen***
- ***Phosphoric Acid 37%***
- ***Spatula for resin***
- ***Suction tips***
- ***Absorbent paper cones***
- ***Chemical or Dual adhesive system***
- ***Thin-tip micro brush for interior of root canal***
- ***Ethanol***
- ***Silane***
- ***Dual or chemical resin sealer***
- ***Curing light***
- ***Diamond tip***
- ***High rotation***
- ***Micro motor and prophy angle***

How is the process?

Assim como em todas as técnicas de reconstrução de dentes tratados endodonticamente, inicialmente, é necessário realizar exames clínico e radiográficopara um correto planejamento do caso. Após a avaliação e indicação dos pinos de fibra de vidro personalizados, parte-se para o tratamento em questão, seguidos da confecção do núcleo de preenchimento, da restauração provisória e por fim, coroa da restauração definitiva.

1st phase: Post Selection

With a clinical and radiographic assessment, it is possible to observe the quality of the endodontic treatment and radicular morphological condition of the tooth that will receive the treatment. Thenceforth, select the post, its size and length, considering the apical seal with 3 to 6 mm of gutta percha. The post, ideally, should have length equal to two-thirds of the dentin remaining; or root implantation equal to the height of the clinical crown proposed; or, at least, half the height of the tooth's bone support[10].

2nd phase: Partial clearing of the root canal and post test

Removal of gutta percha from the inside of the canal is performed with Largo burs, followed by the bur provided by the manufacturer that corresponds to the thickness of the selected post, respecting the preset length limit. You must use a cursor or an overhead projector pen to set the limit of the bur insertion. Using this bur helps in removing any retentive area and promotes expulsion inside the canal, allowing a correct modeling. After clearing the canal, the selected post is tested, and the next step is modeling the canal.

3rd phase: Preparing the customized post and filling core

I. Initially, the glass fiber post surface is treated (ethanol or phosphoric acid), followed by silane application, and then waiting for complete evaporation of the solvent. Afterwards, the adhesive system is applied (this is an optional step).

II. The root canal must be isolated with water-soluble lubricant.

III. A thin layer of composite resin is placed around the post, modeled and then positioned inside the canal.

IV. Initial light curing is performed through the glass fiber post. The post is removed from the root canal and complementary light curing is performed[2].

V. The customized post is repositioned in the root canal and the filling core is made with composite resin.

VI. The core and remainder are prepared for the total crown.

4th stage: Customized post sealing

I. Cleaning of the customized post is performed with Phosphoric Acid 37% for 30 seconds. Next, adhesive is applied on the post, without light curing.

II. IThe sealing agent is applied on the apical part of the post and then the post is inserted in the canal, removing excess cement with a micro brush and then performing light curing for 40 seconds. In this case, a self-conditioning resin-based sealer (U-200, 3m) was used, therefore, the canal was not treated with phosphoric acid and adhesive system. The use of this type of sealer optimizes time and reduces chance of errors in the sealing process[11].

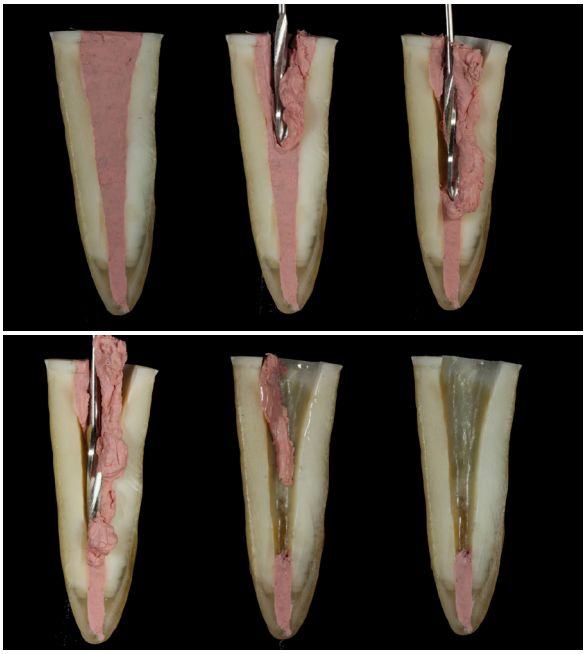
III. After sealing the set composed by modeled post and filling core, it is possible to perform the molding procedure for definitive restoration.

Final Considerations

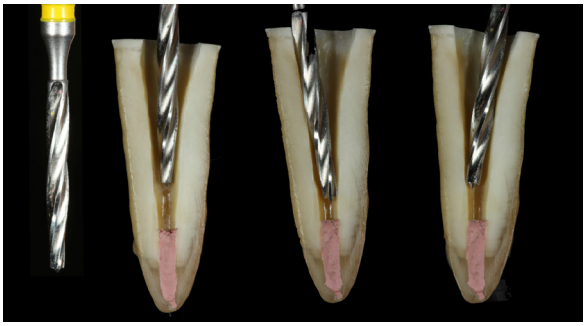
The current trend is to provide a post that better fits the root anatomy established by the endodontic treatment. Custom resinous fiber cores can combine advantages of fused metal cores and prefabricated resinous posts reinforced by fiber. With this technique, it is possible to model the anatomy of the root canal with resin, adapting to the morphology presented after endodontic preparation and removal of any retentive area, thus promoting a better adaptation to the root dentin walls and lower thickness for sealing material. In addition to other advantages, such as possibility of adhesive sealing, and its similarity to the physical and mechanical properties of dentin, reducing the risk of radicular fractures.

PHOTO CAPTIONS:

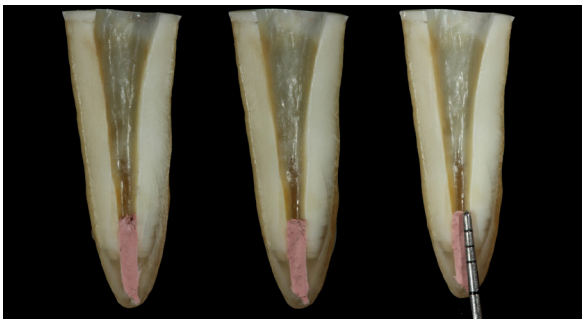
After endodontic treatment is completed, the canal is cleared with a Largo Bur (A-B).



Followed by the Kit preparation bur (Tapered Exacto, Angelus, Brazil) no02, related to the post chosen previously (I); with the same bur, its inclination is changed to remove potential retentive area, providing expulsion to the canal (C).



Note the difference between a retentive canal for a modeled post (I), and after preparation, an expulsion canal (II), as well as verification of the 5mm apical sealing with gutta percha (III) (D).

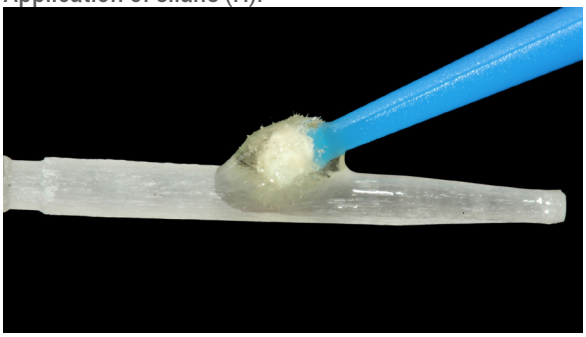


Tooth prepared, ready for modeling (E).

Glass fiber post test (Tapered Exacto 2, Angelus, Brazil) (F).

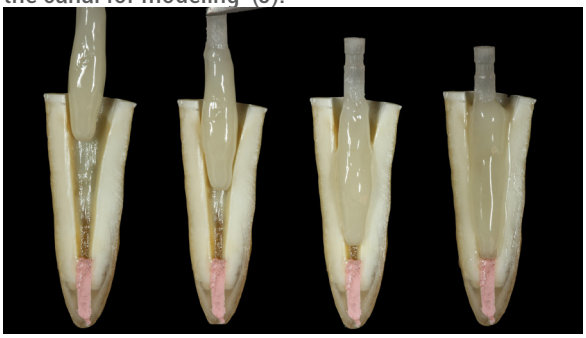
Cleaning of the post surface with Phosphoric Acid 37%, followed by rinsing and drying it (G).

Application of silane (H).

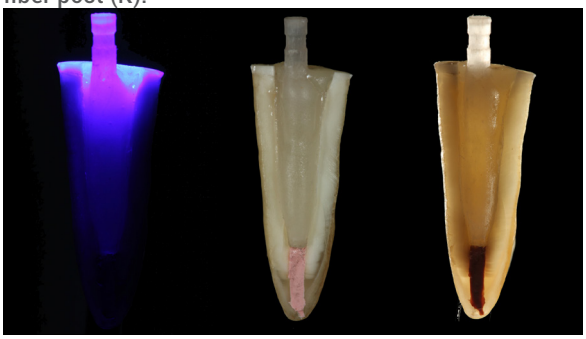


A small amount of resin composite is placed on the post (i), leading the resin along the glass fiber post with a suprafill spatula (II, III) (I).

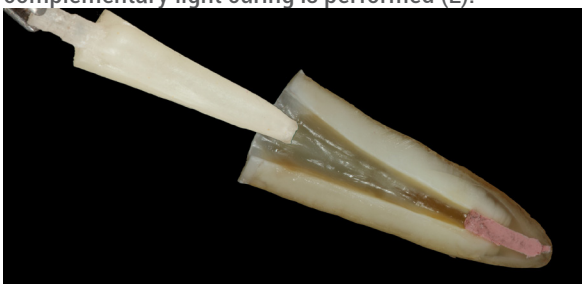
After root canal isolation with water soluble lubricant, the post/composite resin is positioned inside the canal for modeling (J).



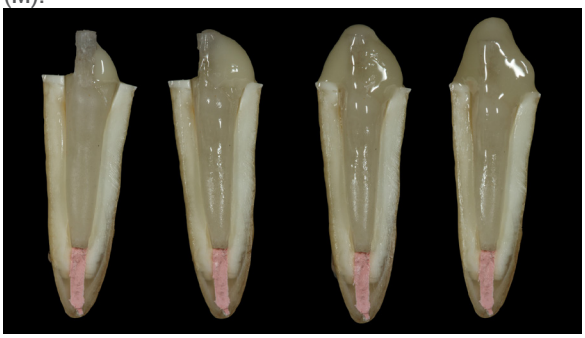
The initial light curing is performed through the glass fiber post (K).



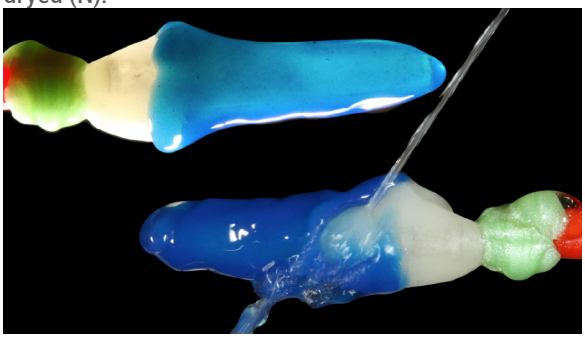
The post is removed from the root canal and the complementary light curing is performed (L).



The customized post is repositioned inside the root canal to prepare the core filling with composite resin (M).

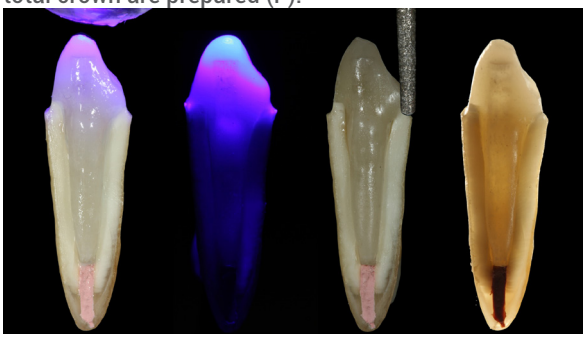


Before sealing, the customized post is cleaned with Phosphoric Acid 37% for 30 seconds (I), (II) rinsed and dryed (N).



Then the adhesive is applied over the post, (I); sealing agent is applied on the apical part of the post (II) by inserting it into the canal (III); after its full insertion, excess sealer is removed with a micro brush. The small sealing agent thickness can be noticed (IV) (O).

With the post sealed, the core and remainder for the total crown are prepared (P).



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