Clinical steps for relining and sealing fiberglass posts

Prof. Dr. Bruno Reis

Specialist in Dentistry
Master in Dental Clinics
Doctor of Oral Biology and Biomaterials
Professor at Federal University of Uberlândia - ESTES/UFU

INTRODUCTION

Endodontically treated teeth that have lost much of their coronary structure require additional mechanisms that assist in retaining the restoration or filling core (SCHWARTZ; ROBBINS, 2004). In this context, placing an intraradicular fiberglass post has been widely used (GORACCI; FERRARI, 2011) due to its advantages over metallic cores, such as aesthetics, not requiring laboratory work, fewer and shorter clinical appointments, in addition to having mechanical properties similar to those of dentin, promoting a biomechanical behavior similar to the natural tooth, therefore, reducing the risk of coronary fracture (CAGIDIACO et al., 2008; SANTOS FILHO et al., 2013). Conversely, one of the mentioned limitations of fiberglass posts is their shape does not adapt to the root canal morphology, creating a thick and irregular sealing line (PEDROSA-FILHO 2006). To overcome this limitation, a procedure relining fiberglass posts using composite resin has been used (GRANDINI et al., 2003).

The relining technique provides a reduced sealing line, less incidence of blobs and defects in the sealant layer, influencing the procedure lifespan (GRANDINI et al., 2005) (PEDROSA-FILHO 2006).

The description below is intended to elucidate and protocol the steps for relining fiberglass posts, to assist the clinician in performing the following steps in the dental practice routine.

CASE REPORT AND PROTOCOL FOR RELINING FIBERGLASS POSTS WITH COMPOSITE RESIN

Figure 1- Initial situation presented by the patient. Ceramic crown with poor marginal adaptation and absence of contact points in the proximal surfaces. By a radiography, the presence of molten metal core with shorter length than recommended was observed, therefore, there was a high risk of root fracture. Santos Filho in 2008 compared the fracture strength and deformation for roots that received molten metal cores and fiberglass posts in different lengths. Study results confirmed that shorter lengths of sealing for metal retainers increase root deformation when being subject to a load and increase the number of root fractures. On the other hand, fiberglass posts do not demonstrate differences in root deformation and fracture regardless of the length of sealing.

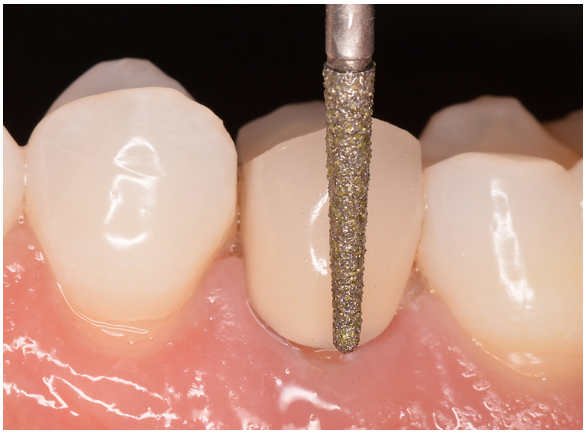


Figure 2 - It was recommended to remove the crown and metal retainer, followed by replacement by a fiberglass post.

Figure 3- Ultrasound was used for removal of the molten metal core. The first step is to reduce the post's coronary portion with a diamond tip until the coronary portion has the same diameter as the root portion. Next, using a piezoelectric ultrasound at its maximum power, position it on all faces of the post, maintaining pressure for 40 seconds. This action will fragment the zinc phosphate cement (which presents friable behavior), making it easier to remove the post.

Figure 4 - After removal of the metallic post, it is observed in the figure above that the canal is wide, especially in the cervical portion. Therefore, in order to promote better adaptation of the sealant to the root, relining the post is required. For this process, the canal is isolated with water-soluble gel applied with a brush.

Figure 5 - After cleaning with 70% alcohol and the assistance of a gauze, treatment of the post surface with 35% hydrogen peroxide must be carried out for 1 minute. It is recommended to use bleaching peroxide from Clàriant-Angelus 35%, by putting a drop on a brush and rubbing on the post surface. The use of peroxide aims to remove the surface resin and expose the post fibers, which increases adhesion value (Menezes et al, 2014).

Figure 6- Peroxide should be removed from the post surface with spray (air + water) for 60 seconds, followed by drying.

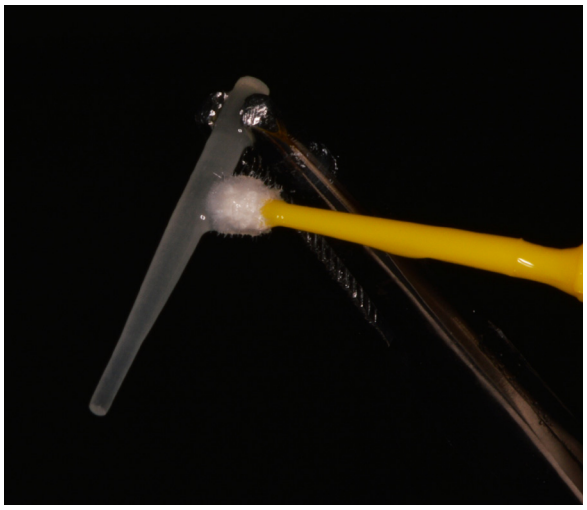


Figure 7- With the dry post, Silane Angelus is applied, using a brush, for 60 seconds. After applying Silane, wait for its superficial evaporation, which occurs in approximately 120 seconds in a plastic dappen pot. Silane is a bifunctional molecule that reacts with glass (Moraes et al. 2015), therefore, if the post remains with silane in contact with the dappen or glass plate, the silane molecule can be consumed.

Figure 8- After silane evaporation, a layer of adhesive is applied. It is recommended to use adhesive free of solvents, that is, only the bond of the Fusion Angelus system.

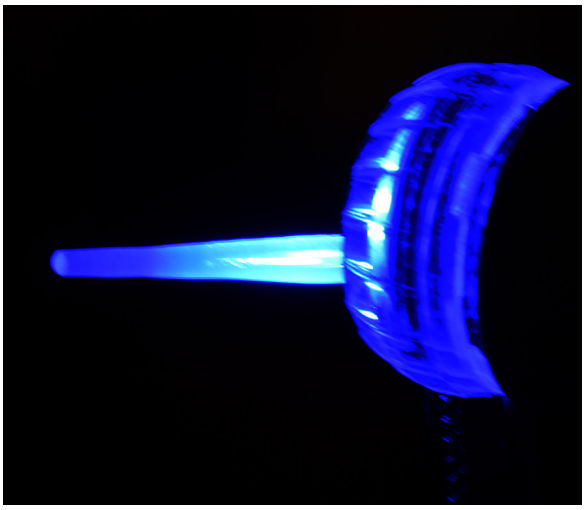
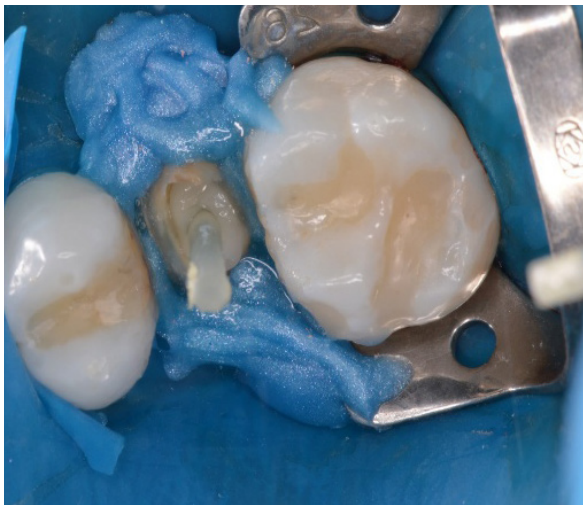


Figure 9- Photoactivation for 60 seconds. Note: Hold the post by the end, avoiding any contact with the area where adhesive has been applied. Adhesive molecules will have to remain free and intact for chemical bonding with the relining composite resin.

Figure 10- Select a nanohybrid or nanoparticulate resin, remove a portion and place it on the post.



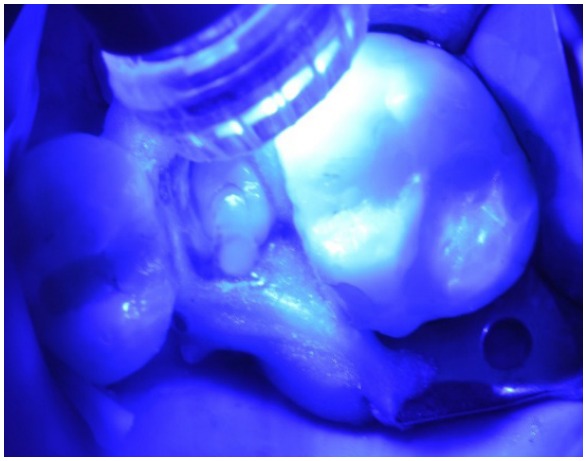


Figure 11- The retainer is positioned in the root canal and photoactivation is performed on one of the faces for 5 seconds. Then, the post must be removed from the canal to complement photoactivation.

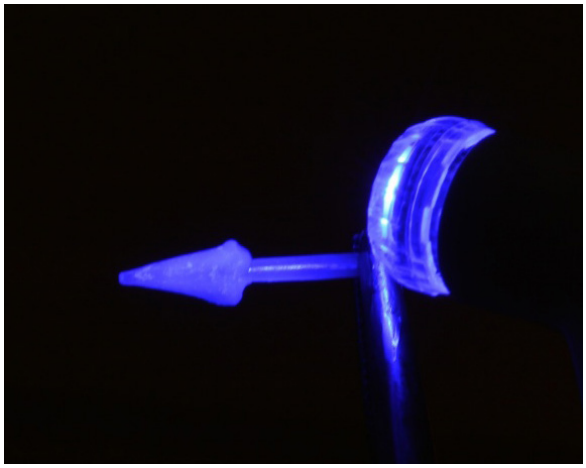


Figure 12- Complement photoactivation outside the root canal for another 60 seconds.

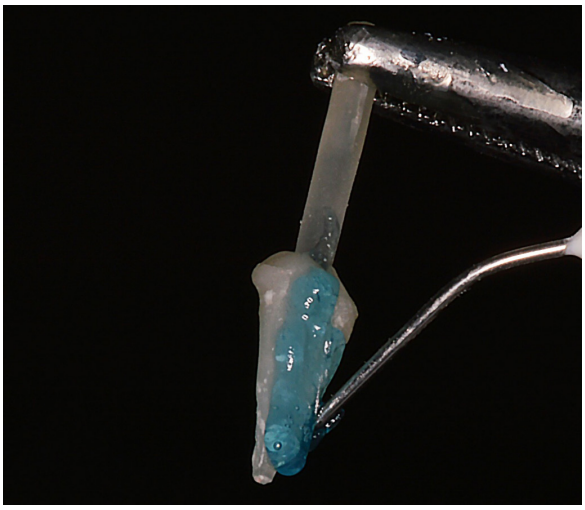


Figure 13- Since after relining, the post is inserted in the canal for adjustment, occurring contamination of post surface, it is recommended, prior to sealing, to perform etching with 37% Angelus phosphoric acid for 30 seconds, followed by rinsing by 30 seconds.

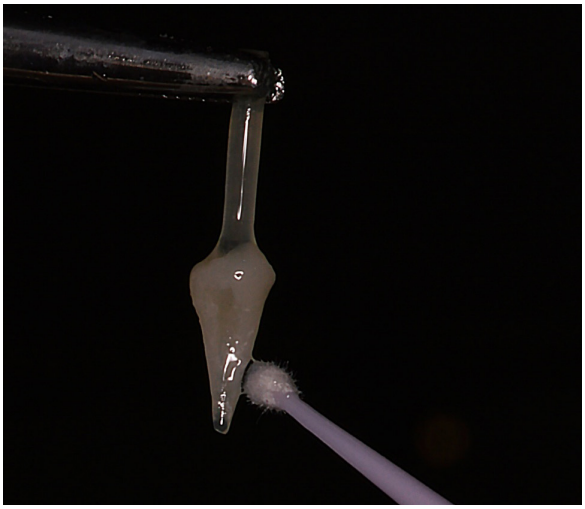


Figure 14- Application of silane Angelus on post surface for 60 seconds.

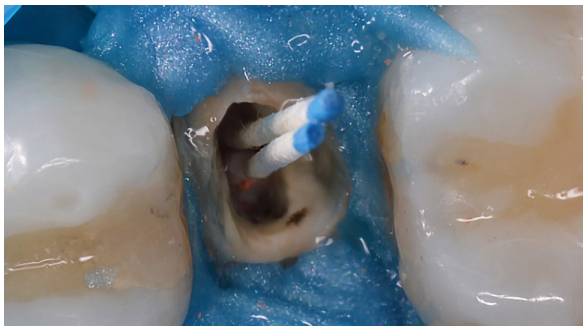


Figure 15- The root canal should be rinsed thoroughly with water and dried with absorbent paper cones.

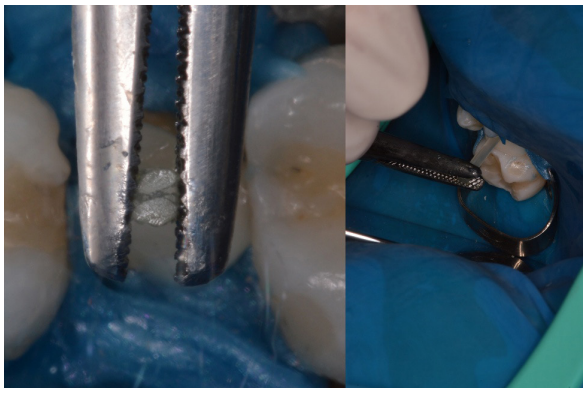


Figure 16 - The self-adhesive cement must be inserted in the canal according to the manufacturer's instructions and the post positioned using tweezers. Note: It is recommended to insert the sealant in the canal with a fine diameter sealant applicator tip that can enter the root canal.

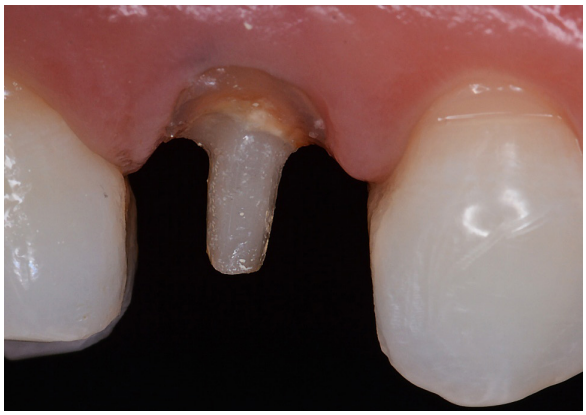


Figure 17- After sealing and removal of sealant excesses, the filling core in composite resin is built, followed by preparation for crown in pure ceramics.

Figure 18- Ceramic glass crown reinforced with lithium disilicate and prepared with sealing by CAD/CAM system.

INTRARADICULAR POST RELINING TECHNIQUE SUMMARY.

1. Intraradicular post selection: A post that best adjusts to the diameter of the root canal should be selected as long as the length of the intraradicular post reaches the entire relief area.
2. Cleaning with 70% alcohol, performed by rubbing a soaked gauze against the post surface
3. Rinsing and drying
4. Applying 35% hydrogen peroxide for 60 seconds using a brush.
5. Rinsing and drying
6. Applying silane actively for 60 seconds, waiting for silane to evaporate keeping it away from a glass surface
7. Applying adhesive system and photoactivation for 60 seconds
8. With the root canal relieved, perform insulation of the canal with water-soluble gel applied with a brush
9. Accommodation of composite resin increment on the post surface and insertion in the root canal
10. Photoactivation for 5 seconds, removing the post, completing the photoactivation with the post out of the canal.
11. Perform etching with 37% phosphoric acid and applying silane on the surface of the relining resin.
12. Rinse the canal with water and air
13. Drying with absorbent paper
14. Insertion of self-adhesive sealant (Note: If the option is to cement the post with conventional

resin sealant, the canal must be hybridized with phosphoric acid and adhesive)
15. Position the post and remove excess sealant.
16. Photoactivate for 40 seconds on each face.
17. Build filling core
18. Cut post

REFERENCES

1. CAGIDIACO, M. C. et al. Clinical studies of fiber posts: a literature review. The International journal of prosthodontics, v. 21, n. September 2005, p. 328–336, 2008.

2. GORACCI, C.; FERRARI, M. Current perspectives on post systems: a literature review. Australian Dental Journal, v. 56, p. 77–83, 2011.

3. GRANDINI, S. et al. Use of anatomic post and core for reconstructing an endodontically treated tooth: a case report.The journal of adhesive dentistry, vol: 5 (3) p. 243-7, 2003.

4. GRANDINI, S. et al. Evaluation of the cement layer thickness after luting two different posts. J Adhes Dent. 2005; 7: 235- 240.

5. Pedrosa-Filho CF. Influência do reembasamento com resina composta (pino anatômico) na resistência à extrusão de retentores intra-radiculares de fibra de vidro. Tese (Doutorado) da Faculdade de Odontologia de Piracicaba, Universidade Estadual de Campinas-UNICAMP- 2006.

6. SANTOS FILHO, P. C. F. et al. Effects of threaded post placement on strain and stress distribution of endodontically treated teeth. Brazilian oral research, v. 27, n. 4, p. 305–10, 2013.

7. SCHWARTZ, R. S.; ROBBINS, J. W. Post placement and restoration of endodontically treated teeth: a literature review. Journal of endodontia, v. 30, n. 5, p. 289–301, 2004.

8. MENEZES MS, FARIA-E-SILVA AL, SILVA FP, REIS GR, SOARES CJ, STAPE TH, MARTINS LR Etching a fiber post surface with high-concentration bleaching agents. Oper Dent. 2014 Jan-Feb;39(1):E16-21.

9. MORAES AP, SARKIS-ONOFRE R, MORAES RR, CENCI MS, SOARES CJ, PEREIRA-CENCI.Can Silanization Increase the Retention of Glass-fiber posts? A Systematic Review and Meta-analysis of In Vitro Studies.Oper Dent. 2015 Nov-Dec;40(6):567-80