Restoration of an endodontically treated maxillary first premolar

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It is common practice that an endodontically treated tooth with significant loss of tooth structure is first to be restored with a post and core before preparation and placement of the final crown. The post and core serve to provide the restoration of the missing tooth structure to help enhance the final strength of the tooth as well as to provide a more ideal resistance and retention form for the final crown. The post traditionally has been thought of as providing retention for the final core material. However, in this era of adhesive dentistry a post can in fact be bonded to the root structure and provide an adhesive benefit to the core and the final crown.

Too many dentists do not place posts when indicated. This may be, in part, due to the extra time required for post placement. This case study will demonstrate how an adhesively placed and retained post and core can be placed with minimal time commitment from the dentist.

Clinical case

A 45 year old male presents with a #12 that has previously been restored with an all-ceramic onlay.

Several years after the onlay was placed, the tooth required endodontic therapy. Currently, the onlay is beginning to fail at the margins and the ceramic shows signs of fracture (Fig. 1). The treatment plan is to place a post and core followed by a lithium disilicate crown.

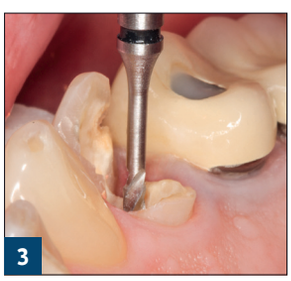

1

The existing ceramic onlay is removed plus a small area of decay. The buccal and lingual canals are located. Using the post drill included in the LuxaPost kit a post space is created in each of the canals to a depth of 10-11 mm (Fig. 2 and Fig. 3).


2

The LuxaPosts are tried into each canal to ensure that they fully seat to place. After that the posts are cleaned with alcohol.

A disposable Tofflemire-type matrix (OmniMatrix, Ultradent) is placed on the tooth. The entire prepared tooth is etched with phosphoric acid for 20 seconds, (Fig. 4) and then thoroughly rinsed with an air/ water spray. The post spaces are then dried using paper points.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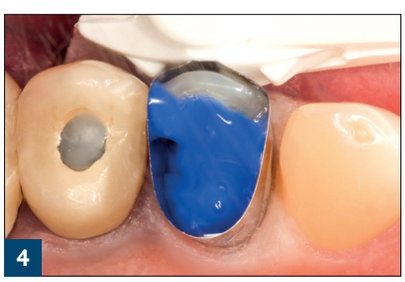
Using the LuxaBond bonding system the entire preparation is treated following the manufacturer's specifications (Fig. 5).

LuxaCore Z-Dual core build-up material has a film thickness that is low enough to be used as dual-cure resin cement. Because of this physical property we are able to inject the LuxaCore Z directly into both post spaces for use as dual-cure resin cement for the posts (Fig. 6).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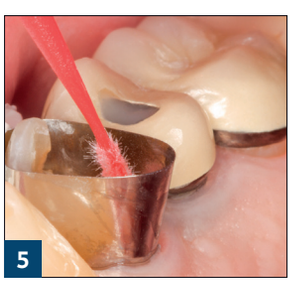
Extrusion is stopped when the LuxaCore Z reaches the top of the post spaces. The LuxaPosts are placed into the post spaces and light-cured for 10 seconds.

Then the entire matrix is filled to the top with the LuxaCore Z (Fig. 7).

The flow characteristics of the material allow for a void free bulk fill and the dual-cure nature of the material provides the opportunity to quickly fill the entire matrix in a single extrusion. The material is light-cured for 30 seconds with the matrix on, and 30 seconds with the matrix off.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Because of the dual-cure nature of the core build-up material the restoration is ready for the final preparation after curing for 60 seconds.

The most internal aspect of the core will reach final cure over the course of the next few minutes due to the dual-cure property of the material.

The preparation design is completed to meet the requirements for a lithium disilicate crown (Fig. 8).

The addition of zirconium to the LuxaCore Z was done, in part, so that the core material will cut with a similar consistency as dentin. This helps the clinician to have a consistent feel during the preparation phase and eliminate the tendency of "ditching" the composite core that can happen with other core materials that do not have this added feature.

The final impression is taken using a fast set polyvinyl silicone impression material (Honigum-Light QuadFast & Honigum-Heavy QuadFast)(Fig. 9).

Additionally, a bite registration (O-Bite) is taken to record the patients occlusion. This information is sent to the lab along with photographs and the written prescription for the final fabrication of the lithium disilicate crown (e.max).

Using the preoperative impression (StatusBlue) the temporary crown (Luxatemp® Ultra) is fabricated, trimmed, polished and cemented into place using temporary cement (Tempo-CemNE). The occlusion is finalized and a final polish is placed on the temporary crown, with the placement of a liquid resin glaze (LuxaGlaze®) to enhance the final esthetics and stain resistance.

When the patient returns the final crown is tried into place and the occlusion is adjusted. The crown is cemented to place using a dual-cure resin cement (Vitique, Translucent) in combination with LuxaBond as the adhesive (Fig.10).

The post-operative radiograph shows the excellent final fit of the crown as well as the final post placement (Fig. 11).

Conclusion

Using a technique that maximizes the benefits of a dual-cure composite resin allows for the ability to efficiently place a post and core material, creates a durable foundation for the final crown and provides the patient with a final restoration that should provide years of service.

Figures:

Fig. 1: Tooth with the all-ceramic onlay
Fig. 2: Root canals after removing the obturation material
Fig. 3: Working with LuxaPost drills to create a post space
Fig. 4: Tooth is etched with phosphoric acid
Fig. 5: Using the LuxaBond bonding system
Fig. 6: Inject the LuxaCore Z directly into both post spaces
Fig. 7: The entire matrix is filled to the top with the LuxaCore Z
Fig. 8: The preparation design is completed for the restoration
Fig. 9: Impression with Honigum
Fig. 10 The final restoration in situ
Fig. 11 Post-operative radiograph

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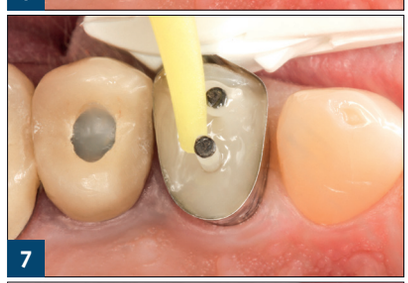
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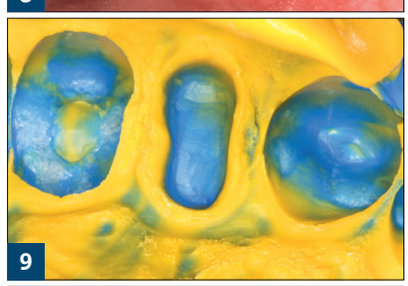
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