CLINICAL BRIEFS

Quick considerations for treatment success.

Do All Endodontically Treated Teeth Require a Post?

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Treatment modalities in restorative dentistry should be implemented with a solid rationale behind them and support from scientific studies. These principles, in conjunction with clinical experience, can dictate when and if a post is required when a tooth has undergone root canal treatment. Dentists know each tooth is anatomically different and should be diagnosed and treated with an individual approach when it comes to its restoration. It is tempting to follow a path that leads into a routine in which every tooth receives the same treatment, especially if it renders excellent, predictable, and long-lasting results.

CONCEPTS TO CONSIDER

When root canal treatment has been completed, the immediate questions include:

- Are a post and core required?
- Is a cast or a prefabricated design preferred?
- What is the material of choice?
- If a post is indicated or required, what system is the best?
- How much tooth structure must be restored?
- What will the loading forces for the tooth/root be?
- Can a ferrule effect be achieved?

It is not uncommon to see fractured roots around endodontically treated teeth due to the rigidity of the posts and cores.[1] With all the variables regarding why fractures may occur, as well as to avoid any possible fracture lines, it is clear that the fit of the post must be passive.[2,3] If an indirect or semi-direct technique is chosen, the impression or plastic/resin pattern must be accurate and extreme care must be taken with the next fabrication steps: handling of the stone, waxing, investing, casting technique and material selected because non-precious alloys will yield too rigid of a post. Even with prefabricated posts, those with metal or zirconia can be too rigid and do not fulfill the role of being a post that will not transfer its load to the root. When compared to a ceramic post, fiber posts provide endodontically treated teeth with higher fracture resistance.[4] On the other hand, there are prefabricated active posts, in which the canal is underprepared with a drill and the post engages the dentinal walls for stability. Such techniques could lead to undesirable forces on a root because of reduced intrinsic dentin strength affected by the absence of a pulp, which results in a decrease in the moisture content of dentin[5,6] and, consequently, more susceptibility to fracture than vital teeth.[7-11]

With long-term endodontic success being paramount, the more remaining tooth/root structure that is present and preserved, the stronger the tooth will be. In the midst of diverse canal configurations and the possibility of irregular walls and undercuts, a prefabricated fiber post should be resistant to fatigue; have a modulus of elasticity similar to dentin; be noncorrosive; include a retentive post and head; be easy to adjust; be easily removed for endodontic retreatment; be radiographically visible; and incorporate different lengths, diameters and tapers.[2]

FIBER POSTS

Since their introduction in the late 1980s, the performance of these posts has delivered excellent clinical results, thus enabling the dentist to restore the involved teeth in a cosmetic and conservative manner. The reason for this success is directly related to fiber posts' ability to absorb or dissipate the forces they will be under during function,[12-20] thus reducing the stress on the root. Furthermore, it has been demonstrated that endodontically treated teeth are reinforced when bonded with these types of posts.[21,22] Among the major transformations the fiber posts have experienced are:

- moving from the carbon fiber post to a tooth-colored material;
- creating mechanical retentions on the post at the root as well as for core retention for additional passive retention;[2] and
- the design of drills that closely match the size of the post,[2] consequently enabling it to have the best possible fit in the canal (Figure 1).

The Peerless Post™ (SybronEndo Corporation, Orange, CA) meets all of the criteria that the restorative dentist looks for in a prefabricated post; it also can be easily adjusted on either or both ends without affecting its fit in the walls of the prepared canal. The smallest post and drill permits its use in the smallest of canals without overpreparing the canal, even on lower incisors. It is designed with rotary files in mind, so the post can be placed in canals without more preparation. Prefabricated posts with more than 50% pre-stressed glass fibers help resist cyclic fatigue; the Peerless Post has more than 60% glass fibers.

CASE PRESENTATION

A patient presented with pain in the lower left premolar in the midst of finalizing a crown for the adjacent molar. The periapical radiograph confirmed the need for endodontic treatment (Figure 2). As the root canal treatment was completed, the endodontist closed the tooth with Fuji IX™ GP (GC America, Inc, Alsip, IL) to seal the tooth, and for proper stability until the tooth was restored (Figure 3). It is important to use the rubber dam for proper isolation and to properly rebuild the missing tooth structure (Figure 4). Using an interproximal matrix will help to restore the tooth with proper gingival marginal adaptation and to its proper interproximal contour, even if the tooth will eventually be crowned.

Once the canal was ultrasonically cleaned, the tooth was conditioned for the "all-etch technique," rinsed, and dried. If needed, the prefabricated post could be modified (Figure 5) and then tried in the canal (Figure 6). Once the length was verified, the canal was slightly remoistened with AQUA PREP™ F (BISCO, Inc, Schaumburg, IL) to maintain the moist dentin while any excess solution was removed with a paper point. The next step was to bond with the fourth-generation bonding agent ALL-BOND® 2 with D/E resin (BISCO, Inc).

Figure 1 The Peerless Post kit.

Figure 2 Lower left premolar with periapical pathology requiring root canal treatment.

Figure 3 Occlusal view of crown permanently cemented on the lower left molar, and root canal treatment completed on the premolar temporarily sealed with Fuji IX.

Figure 4 Restorative materials removed, proper isolation obtained with the rubber dam and matrix before preparing the canal to accept a prefabricated post.

Figure 5 The Peerless Post modified on both ends will not affect the fit of the post in the canal while preserving its mechanical retentions.

The bonding agent was applied to the post, light-cured, and then luted in the canal with C&B™ Cement (BISCO, Inc). The tooth was then built in incremental layers with GRADIA™ DIRECT posterior composite (GC America) (Figure 7). A final radiograph was taken for treatment verification and control (Figure 8).

Figure 6 The Post was tried in the canal before the bonding procedure.

Figure 7 Occlusal view of lower left second premolar rebuilt with a fourth-generation bonding agent and GRADIA Posterior composite.

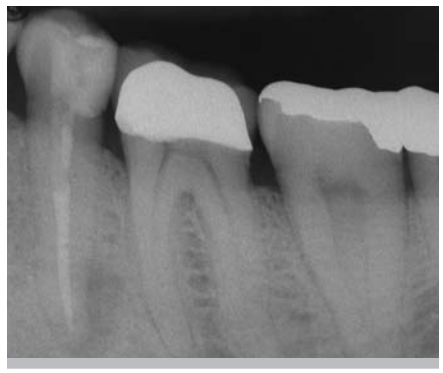

Figure 8 Radiograph of Procera® (Nobel Biocare, Yorba Linda, CA) cemented with Fuji Plus (GC America) and premolar restored with Peerless Post. Root canal treatment performed by Paul F. Bery, DDS. Laboratory work courtesy of Fujiki Toshi, RDT.

CONCLUSION

Part of the controversy of using posts in endodontically treated teeth is that the post did not provide the root with additional strength and possibly weakened it. Currently, with proper bonding protocols, the restoration of endodontically treated teeth using a passive retentive post can help regain some of the lost strength without compromising their longevity. Regardless of the post being parallel, tapered, or a combination, the author's preference is to have a retentive, passive-fitting, bonded post in the canal in addition to retentions for the core build-up.

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