The restoration of endodontically treated teeth was advocated by G.V. Black in 1869 followed by a one-unit post and crown by Richmond in 1878. Engineering principles indicate that structural strength on endodontically treated teeth is decreased by the removal of the roof of the pulp chamber, canal enlargement, and hence loss of integrity. The intrinsic strength of dentin can be diminished as a result of root canal treatment originated by decay, pathology, or trauma. When endodontic treatment is indicated, one must consider that the resulting anatomy and configuration of the canal(s) can vary according to its original anatomy, canal access, canal enlargement, and chemomechanical preparation. In addition, intrinsic dentin strength may be adversely affected by the absence of a pulp that results in a decrease of moisture content of dentin and consequently becoming more susceptible to fracture than vital teeth (Figure 1).

The need to provide internal support to the endodontically treated tooth before placement of a coronal restoration is clearly documented as well as for coronal stabilization. In the past it was advocated to conservatively restore pulpless posterior teeth with pins and amalgam. Such technique, because of the friction and self-threading of the pins, produced stresses and strain unto the dentin because of the wedging action, resulting in minute fracture lines and crazing. Lovdahl described in 1977 that endodontically treated teeth with a conservative root canal filling and intact coronal structure were found to be stronger than root canal–filled teeth with cast-gold dowel cores or pin-retained amalgam cores.

Before restoration, a thorough evaluation of the affected tooth or teeth and its remaining tooth structure must be made to form an accurate diagnosis. This should include the following considerations: (1) Is the tooth restorable? (2) What is the health of supporting bone and periodontal tissues? (3) What is the mobility? (4) Is at least 2 mm of sound tooth structure available for a ferrule effect? (5) Are the quadrant, arch, and entire dentition restorable? (6) What is the relation of the tooth to the occlusal plane? (7) What is the importance of the tooth to the overall treatment plan? (8) Endodontic complications can lead to apicoectomy treatment; therefore, apical seal and post reconstruction techniques can influence long-term prognosis. (9) What is the cost?

For several years cast post and cores were used to rebuild missing tooth structure, either with an indirect tech-
nique when an impression is taken and a wax pattern is created and cast in type 3 gold or semidirect technique in which the pattern is created in the mouth (Figure 2). In either case, critical steps include the creation of a wax or acrylic pattern to be completed with proper control of volumetric changes and compensation from all materials used, such as impression material, stone, wax, or acrylic, investment, casting technique, and alloy used. It is of utmost importance that the attained result creates a post and core with a passive fit onto the root or tooth. Otherwise, undesirable stress will be immediately transferred into the root, which could lead to eventual vertical fracture and loss of the tooth.

CURRENT CONCEPTS FOR RESTORATIVE SUCCESS WITH ENDODONTIC-TREATED TEETH

Once endodontic success is determined, current concepts are to reinforce such teeth with a bonding protocol as the lost tooth structure is being replaced with a proper fitting and passive post which includes a self-retentive head to support a core.19

Fiber posts have been used in the restoration of endodontically treated teeth since their introduction in the late 1980s (COMPOSIPOST/C-POST; Recherches Techniques Dentaires, Grenoble, France).20

These fiber posts have shown good clinical behavior in different studies: 99% success rate in 236 patients after 2 to 3 years,21 99% in 94 teeth after 1 year,22 95% in 1304 cases between 1 and 6 years,23 and 200 cases in 4 years,24 99% in 180 posts after 18 months,25 and 89.6% in 52 teeth after 6 to 48 months.26 No catastrophic failures (root fractures) were reported.

One author’s (E.K.) personal clinical data showed 95.4% success rate in 454 fiber posts placed over a period of 6 years (February 2000 to January 2006). The posts placed
were 14 C-Post (RTD-Bisco) (case 1; Figures 3-9), 8 DT Light-Post (RTD-Bisco) (case 2; Figures 10-15), 216 ParaPost Fiber-White (Coltene/Whaledent) (case 3; Figures 16-22), and 216 of the new Peerless Post (SybronEndo) (case 4; Figures 23-30). Of the 21 failures (4.6%), 8 (4 Fiber-White and 4 Peerless Post) were de-bonded and 13 (6 Fiber-White and 7 Peerless Post) were post fractures.

A review of the literature of currently marketed post systems, along with our own clinical experience and the effect that post design has on clinical success, all lend themselves to a rationale for a new post design: The PeerlessPost system by SybronEndo.

With current evidence-based research, this article describes the simplicity, efficiency, and safety aspects of the Peerless Post system.

**IDEAL POST DESIGN**

The ideal post system or design must consider endodontic as well as restorative principles and include the following:

- **Anatomical form similar to the lost dental volume**
  
  The overall, essential shape of the post is tapered, to mimic the root canal treatment (Figure 3).

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  The ideal post system or design must consider endodontic as well as restorative principles and include the following:

  - Anatomical form similar to the lost dental volume
  - The overall, essential shape of the post is tapered, to mimic the root canal treatment (Figure 3).
Minimal (conservative) preparation

The post can be placed in the canal without further preparation after the endodontic therapy.

Adequate material

Prestressed fibers are homogenously distributed in a resin matrix to avoid structure defibration and deterioration (Figure 32).³²

Resistance to fatigue

Testing indicates that posts with higher content (more than 60%) of prestressed quartz or glass fibers resist cyclic fatigue better than posts with less fiber (less than 50%).³³ The PeerlessPost has more than 60% of Glass Fibers.

Elastic modulus similar to dentin

The elastic modulus should be 15 to 40 GPa.

Noncorrosive

Unlike base casting metals and stainless steel, fiber post material cannot corrode.

Retentive (post and head)

The design should offer a self-retentive body and a self-retentive, antirotation head (Figure 33).

Easy to adjust and fit

The post should allow adjustments in the apical area as well as the...
coronal area, at the clinician’s discretion and without compromising lateral adaptation in the canal. Because of the mechanical properties of the fiber posts and the reliability of adhesive cementation techniques and materials, the depth of a fiber post can be equal to or slightly greater than the length of the clinical crown (Figure 34).34

Radiographically detectable
The post should be detectable by radiography (Figure 35).

Versatile
We need different lengths, diameter, and tapers to fit most clinical situations (Figure 36).

Easily removable
The removal of posts can be a major obstacle in the retreatment of teeth that have recurrent disorders. The use of fiber posts offers the advantage of an easy removal.35

CONCLUSIONS
Modern dental restorative treatment of endodontically treated teeth must consider the preservation of dental tooth structure. It is necessary that from the beginning (root canal treatment), we must use techniques...
that do not remove much additional
dentinal tissue, use posts that from
its nonrigid nature reduce the risk of
fractures both in the root and in the
post itself, and that the adhesive ce-
mentation procedure be as simple as
possible to obtain a final restoration
with a high success rate. The Peer-
lessPost system is a new alternative
to the fiber post concept that offers
characteristics not found in any
other systems.

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Figure 29. Buccal view in occlusion ver-
ifying interocclusal clearance.

Figure 30. Radiographic view, showing
excellent fit of post. Dentistry by Sergio
Rubinstein, DDS.

Figure 31. Section of a post in place,
showing the intimate adaptation be-
tween the post and the prepared canal.

Figure 32. Cross-section showing fibers.

Figure 33. Self-retentive body and a
self-retentive, antirotation head.

Figure 34. Post is measured to deter-
mine length of head for ideal core sup-
port to withstand forces during function.

Figure 35. Radiopaque fiber posts.

Figure 36. Color coded for easy identifi-
cation of diameter and taper.


