

The Evolution of Posts

BISCO OFFERED FIBER REINFORCED POST TECHNOLOGY FIRST!

Prefabricated posts were introduced in the 1950s. Early products were made of metal, mostly stainless steel and then followed by titanium alloys. Metal was chosen because of its intrinsic high mechanical properties, which was thought to increase the strength of the remaining dental structure. Metal posts, however, presented shortcomings such as the tendency to undergo corrosion (if not a noble alloy) and for not being aesthetic, thus likely to compromise the look of the final aesthetic restoration. Follow up studies have shown that stiffer metal posts were not ideal for absorbing stress to prevent root fractures. Ideal posts should have mechanical properties and behavior such as that of tooth structure.

Low-modulus, fiber-reinforced posts were introduced in 1990 to address the concerns of stainless steel and titanium alloys. The Modulus of Elasticity of the fiber post is comparable to the dentin (~20 GPa) and is 5-10 times less rigid than high-modulus metal posts, allowing the post to absorb stress to prevent root fractures. Fiber posts were bonded to the tooth utilizing an etchant, primer, adhesive and resin composite technique. With the post bonded to the tooth, the post's low-modulus of elasticity afforded the fiber post and the tooth to flex together, dissipating any forces placed on the tooth to greatly reduce the risk of root fractures.

FEATURES OF POSTS AVAILABLE	FIBER	METAL
Flexural Strength	✓	
Ideal Modulus of Elasticity	✓	
Aesthetics	✓	
Ability to Remove	✓	
Radiopaque	✓	✓

Benefits of Fiber Posts:

- *Fiber posts have greater tensile strength than stainless steel or titanium alloy posts and therefore, unsurpassed mechanical properties*
- *Fiber posts have a Modulus of Elasticity similar to dentin (~20 GPa) and are 5-10 times less rigid than metal posts reducing the risk of root fractures (Figure 1)*
- *Fiber posts have a neutral or translucent shade and, unlike metal posts, do not require masking (Figure 2)*
- *Removal of cemented metal posts can be tedious and traumatic to the tooth, while fiber posts are removed quickly and atraumatically by hollowing out the post*

Figure 1

Young's Modulus of Elasticity (GPa)

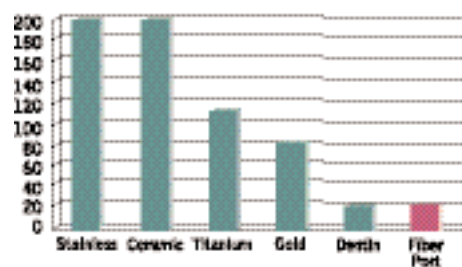
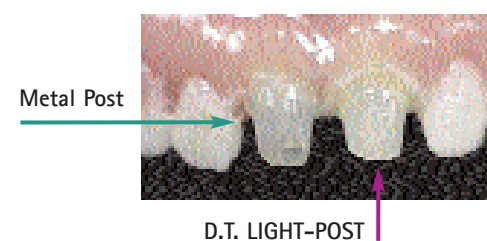


Figure 2

#8 and #9 - Core build-ups using the same shade. Notice the aesthetic compromise with the metal post in #8.



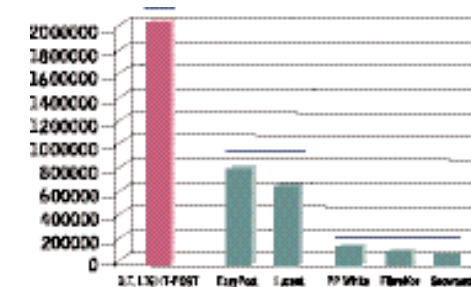
BISCO's D.T. LIGHT-POST® vs. Other Fiber Posts

According to a recent study, "Fiber-reinforced materials, like composite materials, owe their mechanical properties not only to the characteristics of the single components (fibers and resin), but also to the bonding strength in the interface of the two components and to the reinforcing geometry. The addition of fibers to a polymeric matrix causes a significant increase in the material's resistance to fracture, hardness and fatigue resistance."¹ Fatigue tests provide a more realistic indication of clinical performance than single-load testing. In a recent study, in which 6 fiber posts were tested, the D.T. LIGHT-POST was significantly more fatigue resistant than the other samples indicating superior strength (Figure 3).

BISCO's D.T. LIGHT-POST is constructed from unidirectional, pre-stressed, quartz fibers. Another significant difference between fiber posts is their shape. The D.T. LIGHT-POST has a double taper that represents the morphology of the root canal thereby providing a more intimate adaptation to the canal than other fiber posts available. This design saves tooth structure and increases the strength of the fiber post. The D.T. LIGHT-POST is also optically translucent and transmits light to the apex. Unlike many other fiber posts, the D.T. LIGHT-POST is highly radiopaque (Figure 4).

Figure 3

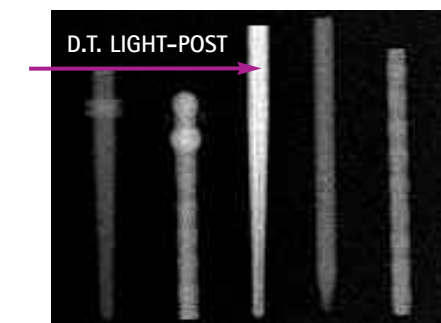
The average number of cycles that each post withstood before fracture.¹



Il Dentista Moderno, March, 2004

Figure 4

Radiopacity of D.T. LIGHT-POST is compared with other fiber posts



* D.T. LIGHT-POST is a registered trademark of RTD France.

1. Grandini, S., Goracci, C., Monticelli, F., Borracchini, A., Ferrari, M. An evaluation, using a three-point bending test, of the fatigue resistance of certain fiber posts. Il Dentista Moderno, March 2004: 70-75.