

Fiberfill

A Fiber Reinforced Adhesively Bonded Endodontic Obturator and Post System

Endodontic therapy provides opportunities to maintain teeth in function and improve the health of the dentition. The long-term prognosis for endodontically treated teeth is greatly influenced by how well the coronal and apical seal are achieved.

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Reinfection may result due to coronal leakage through temporary fillings to the apex within 30 days and may be a significant contributing factor to endodontic failure. KHAYAT¹ found that significant coronal dye and bacterial leakage following exposure of sealed root canals to artificial and natural saliva occurred within 30 days through to the apex. Root fracture, another reason for endodontic failure may result from forceful obturation techniques such as lateral or vertical condensation of gutta percha.²⁻⁴ Lateral and vertical condensation with zinc oxide and eugenol (ZOE) or epoxy sealers, which has been the standard obturation method have demonstrated high fracture rates. MEISTER's study⁵ suggested that excessive force during lateral condensation of gutta percha resulted in 84.38 % of the fractures noted in a study of 32 cases of vertical fracture. Whereas, obturation with a single cone of gutta percha and a passive fit with a strong resin sealer resulted in more favorable results.⁶

A fiber-reinforced obturator combined with an adhesive and sealer will be addressed, called Fiberfill (Pentron Clinical Technologies, Wallingford, CT)

which strengthens the root structure, decreases apical and coronal leakage and provides anchorage for a restorative core.

Apical and coronal Leakage

Two factors that influence the seal of the canal are the obturation method and the sealer.

Single cone techniques were significantly more effective than lateral condensation techniques regarding length of dye penetration.⁷ The single cone procedure provided an adequate apical seal against dye penetration, sealing the apical portion passively. Leakage was greatest in the laterally condensed samples with leakage most significant in the first 3 mm from the apex.⁸

Carrier delivered gutta percha was found to be superior to lateral condensation technique in terms of both core/sealer ratio and dye leakage.⁹ Condensation techniques (lateral and vertical) may remove sealer from the canal walls during the procedure so forceful obturation may not only increase vertical fracture potential but decrease the sealability of the obturation.¹⁰ It was also seen that cold lateral condensation has a higher proportion of specimens with leakage in canals with curvature greater than 20 degrees than in canals with curvatures less than 20 degrees. Therefore, gutta percha delivered to the apex in curved canals had lower leakage.¹¹ Hence the carrier delivered gutta percha will allow better placement in the canal and improve sealability. The drawback is that the carrier or a portion needs to be removed in order to restore the tooth, possibly disrupting the apical seal in the process.

Although warm lateral condensation resulted in a poor obturation, it was the only thermoplasticized technique analyzed that did not produce significant volumetric changes between 0 min and 30 min. All the other thermoplasticized filling techniques showed significant shrinkage during cooling.¹² Filling of the canal, with warm gutta percha may show

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