A comparative evaluation of sealing ability of restorative materials used for coronal sealing after root canal therapy

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In the past few years the importance of coronal seal following root canal therapy has been emphasised. Adhesive restorative materials have been used, considering their good bond strength and their sealing ability. In this study, the sealing ability of resin modified glass ionomer has been compared with composite resin used with fifth generation bonding agent (in vitro), using methylene blue dye penetration method. Resin modified glass ionomer showed greater leakage than composite resin, although it was not statistically significant. Further studies are needed to assess the sealing efficacy in clinical situations.


KEY WORDS : Microleakage, Resin modified glass ionomer, Composite.

The success of endodontic therapy depends on a thorough biomechanical preparation for the removal of necrotic debris and bacteria from the root canal followed by sealing the root canal to prevent ingress of bacteria and tissue fluids. Dow and Ingle (1955) stated that failure most commonly occurs due to inadequate apical seal\textsuperscript{1}. Studies have shown that a good coronal seal is equally important. Swatz et al (1983)\textsuperscript{2} found that the failure rate was twice as high in cases without an adequate coronal restoration compared to cases which were adequately restored. Swanson and Madison (1987)\textsuperscript{3} found that none of the root canal sealers used with laterally condensed gutta percha could prevent coronal microleakage. Further, the finding of Khayat et al (1993)\textsuperscript{4}, that in less than thirty days, bacteria present in the saliva can seep into the root canal irrespective of the condensation technique, emphasizes the need for a coronal restoration with good sealing ability. Esthetic adhesive restorative materials have shown better sealing properties than other materials. Composite resins, introduced by Bowen (1962)\textsuperscript{5} have shown good marginal sealing ability, especially when used with newer generation bonding agents. These bonding agents are a one bottle system with bond strength >15Mpa\textsuperscript{6}. There only limitation is polymerisation shrinkage\textsuperscript{7}.

To overcome the disadvantages of glass ionomer cements such as moisture sensitivity and susceptibility to dessication, Mathis and Ferracane (1989)\textsuperscript{7} introduced the resin modified glass ionomer cements. A resin component is incorporated into the cement and is cured with visible light, which gives the advantage of longer working time and better bond strength. This combined with chemical bonding and fluoride releasing properties similar to conventional glass ionomers, makes it a good option for sealing the coronal access cavity in root canal treated teeth\textsuperscript{8}.

The aim of the present study was to compare the coronal sealing ability of resin modified glass ionomer(Vitremer) with hybrid composite resin(Spectrum TPH) used along with single bottle bonding agent Prime and Bond.

MATERIALS AND METHODS

Fifty non-carious single rooted human teeth extracted for orthodontic purposes or due to periodontal reasons were collected. The teeth were stored in normal saline, soon after extraction. Prior to the study, the teeth were kept in sodium hypochlorite solution for 24 hours and rinsed with water. Preoperative radiographs were taken and those teeth with incomplete apex formation, evidence of root fracture, more than one canal, bifurcated canals, curvature >5 degrees, ribbon shaped canals or canals with extreme calcifications were excluded. Finally 30 teeth were used in the study.

Standard access cavities were prepared using a round ended tapered fissure diamond bur and No. 2 and 4 round burs in a high speed hand piece under air-water