Evaluation of Selected Properties of a Prototype S-PRG Filler Containing Root Canal Sealer

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Abstract: The surface reaction type pre-reacted glass-ionomer (S-PRG) filler confers the ability to release fluoride and other ions when added to various filling materials including resin composites. In this study, some properties of a prototype S-PRG filler-containing root canal sealer (S-PRG sealer; Shofu Inc.) were evaluated. A zinc oxide-eugenol sealer (PulpDent root canal sealer) was used as the control material. The coronal sealing ability of the test and control sealers, used with or without gutta-percha points, was assessed with a dye penetration test where the penetration of basic fuchsin at 1-, 3- and 5-mm levels from the canal orifice was scored after 60 days of immersion. Distribution of F, Sr and B in the root canal wall dentin was mapped at 7 and 60 days after root canal filling by means of electron probe microanalysis. The antibacterial activity of fresh and set (12h after mixing) sealers against Enterococcus faecalis, Propionibacterium acnes and Actinomyces israelii was examined with an agar diffusion method.

The results were as follows:
1. When dye penetration scores were compared, no significant differences were observed at each level (Kruskal-Wallis test, p > 0.05).
2. Distribution of F and Sr was detected along the root canal dentin in contact with the S-PRG sealer, although this was not observed for the PulpDent sealer.
3. Both sealers of both fresh and set preparations showed antibacterial activity against P. acnes and A. israelii, whereas activity against E. faecalis was not detected.

It was concluded that the prototype S-PRG sealer has the ability to release F and Sr, and that the coronal sealing ability and anti-bacterial capacity of the S-PRG sealer are comparable to those of zinc oxide-eugenol sealers.

Key words: S-PRG filler, Root canal sealer, Root seal ability, Ion releasing capacity