

Original Article



Interfacial adaptation of newly prepared nano-tricalcium silicate-58s bioactive glass-based endodontic sealer

Abstract:

Background. The sealer's interfacial adaptability is one of the critical factors for successful root canal therapy. This study evaluated and compared the interfacial adaptability of newly prepared nano-tricalcium silicate-58s bioactive glass-based endodontic sealer (C3S-BG-P) to root dentin with two bioactive sealers Nishika Canal Sealer BG and BioRoot™ RCS.

Methods. Thirty newly extracted single-rooted lower premolars were decoronated and instrumented. The roots were assigned to three groups: C3S-BG-P, Nishika Canal Sealer BG, and BioRoot™ RCS ($n = 10$) and obturated with the single-cone method. Each root was sectioned horizontally to obtain three slices at 2, 5, and 10 mm from the apex. The width of the gaps at the sealer–dentin interface from each section's mesial and distal sides was measured under a field emission scanning electron microscope (FESEM) at $\times 1.0$ using the Digimizer software program. One-way ANOVA and post hoc Tukey tests for multiple comparisons were used to interpret and analyze the collected data.

Results. The mean gap width at the sealer–dentin interface of C3S-BG-P and Nishika Canal Sealer BG was significantly less than that of BioRoot™ RCS at all root sections ($P \leq 0.05$). However, the mean gap width at the sealer–dentin interface of C3S-BG-P was not significantly different from Nishika Canal Sealer BG ($P > 0.05$). Moreover, there were greater interfacial gaps at the apical level than at the coronal level for all the tested sealers.

Conclusion. C3S-BG-P exhibited interfacial adaptation that was nearly comparable to Nishika Canal Sealer BG and superior to BioRoot™ RCS.