

# Comparison of Microleakage of BC Sealer and AH-Plus Sealer vs. Presence of Smear Layer in Single Canal Teeth Using Single-Cone Technique

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**Objective:** Microleakage remains a common cause of failure for endodontic treatments. While differences in the properties of sealers could contribute to treatment success, presence of smear layer may also seal dentinal tubules for improved sealing ability. BC sealer has been shown to have improved adhesion and sealing ability than AH Plus sealer, while results on smear layer efficacy remain equivocal. There is a lack of studies comparing the effect of these two factors on microleakage when utilized with single-cone technique. In this study, we compared performance of BC sealer and AH Plus sealer against microleakage when the smear layer is absent vs. present on single-cone technique treated teeth.

**Methods:** Forty-six single-rooted, single canal extracted teeth were cleaned, shaped, and obturated using the single-cone technique. Teeth were standardized to length of 20 mm and master apical cone of 35/.04. Four classifications were established: BC sealer without smear layer (BCN), BC sealer with smear layer (BCSM), AH Plus sealer without smear layer (AHPN), and AH Plus sealer with smear layer (AHPSM). Controls for each group were filled with an additional 2mm of composite. Methylene blue was placed in the pulp chamber and presence of leakage through the apical foramen was observed for one month. Teeth were sectioned and microleakage through the root canal was measured. All experimental data were analyzed using a two-way ANOVA test using R statistical software (R Core Team 2020), comparing sealer and smear layer. A p-value of <0.05 was considered statistically significant.

**Results:** Methylene blue leakage through the apical foramen was not observed in any of the samples. We found that sealer and smear layer were not conditional on microleakage effect. Leakage differences through canals treated with AH Plus and BC sealer were not statistically significant but were significant between the presence and absence of smear layer.

**Conclusion:** Although our results indicated that type of sealer did not affect sealing efficacy, we found that root canals with smear layer present prior to obturation demonstrated reduced microleakage compared to those treated with EDTA for smear layer removal.

*This study was supported by the UTSD Student Research Program and the Scott and Mary Makins Endodontic Education Endowment by the Department of Endodontics.*