

ABSTRACT:

Aim: To compare the effectiveness of 0.2% Chitosan and Smear clear on the adhesion of Apexit plus and AH plus root canal sealers to root canal dentin using push out bond strength test.

Methodology: Forty extracted human mandibular premolars with single canal were collected and decoronated at cementoenamel junction (CEJ). Cleaning and shaping was done with ProTaper rotary file system (*DentsplyMaillefer; Ballaigues, Switzerland*) up to size F4 using 3% Sodium Hypochlorite as an irrigant. Teeth were randomly divided into 2 groups of 20 each according to the final rinse used for removal of smear layer. Group 1 with 0.2 % chitosan, Group 2 with 17 % EDTA. Further each group was subdivided into two subgroups (n=10) based on the sealer that was used. Group-A: AH Plus (DENTSPLY, De Trey GmbH, Konstanz, Germany), group-B: Apexit Plus (IvoclarVivadent, Schann, Leichtenstein). All the specimens were stored at 37°C, 100% humidity for 14 days to ensure complete setting of the sealers. Root specimens were transversely sectioned perpendicular to the long axis of root using diamond disc to obtain a section of 2mm thickness from middle third for push out bond testing. The root canal filling in each section was subjected to universal testing machine at a cross head speed of 1mm/min. Load was applied in apico coronal direction until bond failure occur. The maximum load before failure was recorded in Newton's (n) was to calculate the push out bond strength (Mpa). Two representative specimen of each group were separately prepared for scanning electron microscopy (SEM) to analyse the surface morphology of root canal dentin after irrigation with different irrigants

Results: Mean push out bond strength values (MPa) of the Chitosan AH plus (2.32 ± 0.34 mpa) was better than the Smearclear AH plus (1.94 ± 0.58 mpa), Chitosan Apexit plus (0.76 ± 0.29 mpa) and Smearclear Apexit plus (-0.43 ± 0.13 mpa). Among the all four groups tested, even though specimens treated with the chitosan shows better push out bond strength, there is no significant difference found between any groups. AH Plus Root canal sealer showed highest bond strength, irrespective of the final irrigant used. This is due to the ability of AH Plus sealers to form covalent bond by an open epoxide ring to any exposed amino group in collagen, long term dimensional stability and low polymerization stresses.⁶⁵

Conclusion: Under the experimental conditions and within the limitations of this study, the smear layer removal efficacy of 0.2% Chitosan as a final rinse was equally effective to that of 17 % EDTA as final rinse. The minimum push-out bond strength values seen in Apexit plus sealer groups, which suggest that AH plus provides better Adhesion and good sealing properties. Although push out bond strength was better with the groups which used 0.2 % chitosan as final irrigant, but there was no significant difference found when compared with the groups irrigated with 17 % EDTA.

Key words: chitosan , Smear clear , push out bond strength , AH plus , Apexit Plus .