



BRISBANE, AUSTRALIA

84th General Session & Exhibition of the IADR
1st Meeting of the Pan-Asian-Pacific Federation
(Australian/New Zealand, Chinese, Korean, Japanese, and Southeast Asian Divisions
of the IADR)

Evaluation of gap formation with two resin based canal sealers

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Objective: The purpose of this in vitro study was to evaluate gap formation between two resin based sealers and root dentin. **Methods:** Thirty extracted human single rooted teeth were decoronated to a length of 11 mm, instrumented to a 45 K file, irrigated with 5% NaOCl and then rinsed with 17% EDTA finally. The roots were randomly divided into 3 groups (n=10). In Group 1, the teeth were obturated with AH Plus sealer (Dentsply). Epiphany (Pentron) root canal sealer was used in Group 2 and a dual cure adhesive system (Bond It, Pentron) was used with Epiphany in Group 3. The sealers were placed into the canals using a master cone and lentulo according to the manufacturer's instructions. The samples were kept in 100% humid at 37°C for 2 weeks after obturation. The roots were then sectioned into three parts using an Isomet Saw under water cooling and photographs were taken from coronal, median and apical parts of the roots using a stereomicroscope (Olympus SZ 30, X13.2) in combination with a micrometer. The length of the gap occurred within the sealer for every sample was measured using ruler in Photoshop CS and recorded as mm. The data was analyzed using ANOVA with a .05 level of significance. **Results:**

Gap formation (mm)	Apical Region	Median	Coronal
AH Plus	0.0600 (0.00-0.24) ^{ab}	0.1130 (0.00-0.54) ^{ab}	0.1750 (0.00-0.64) ^{bc}
Epiphany	0.0220 (0.00-0.14) ^{ab}	0.0230 (0.00-0.23) ^{ab}	0.0270 (0.00-0.18) ^{ab}
Epiphany + Bond It	0.0170 (0.00-0.17) ^a	0.0070 (0.00-0.07) ^a	0.0530 (0.00-0.20) ^{ab}

Values are Mean (Min-Max). Different superscripts show significantly different groups ($p < 0.05$).

Two way ANOVA results indicated that AH Plus showed significantly more gap formation when compared to Epiphany with or without adhesive application ($p = 0.001$) Use of dual cure adhesive did not have a positive effect on gap formation when used with Epiphany ($p = 0.998$).

Conclusion: AH Plus showed significantly less gap free interfaces when compared to Epiphany groups and use of dual cure adhesive did not reduce gap formation in the roots sealed with Epiphany.