

**Shear Bond Strength of Endodontic Sealers to  
Dentin With and Without Smear Layer and  
Gutta-percha  
(In Vitro Study)**

A Thesis

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# Abstract

The bond strength of root canal sealers to dentin and gutta-percha seems to be an important property for maintaining the stability of root canal filling, which potentially influences both leakage and root strength.

The purpose of this study was to evaluate the shear bond strength of three different endodontic sealers (Gutta-Flow, AH Plus, Apexit Plus) to dentin, in the presence and absence of the smear layer and gutta-percha. After slicing off the occlusal 2mm of the 60 extracted human maxillary premolar teeth, an exposed dentin served as the tested surfaces; the teeth were fixed with cold cure acrylic, and were divided into two groups according to the smear layer presence, **group A** without smear layer when dentin surface was irrigated with EDTA 17% followed by distilled water then subdivided into 3 subgroups according to type of sealer: (GF-D, AH-D, Ap-D); **group B** when dentin surface was washed by distilled water only, then subdivided into 3 subgroups: (GFD-S, AHD-S, ApD-S). Thirty samples of gutta-percha were prepared and named as **group C** which were subdivided into 3 subgroups: (GF-G, AH-G, Ap-G).

Five mm long section of polyethylene tubes, filled with freshly mixed sealer were placed on the dentin or gutta-percha surfaces and then tested for shear bond strength test, after one week, by Instron Universal Testing Machine at a cross head speed of 0.5 mm/min. The data was calculated in MPa and was statistically analyzed, the results showed that there was a highly significant difference in the shear bond strength ( $P < 0.05$ ) in comparison among the tested groups, Gutta-Flow showed non significant difference in bond strength to dentin with and without smear layer, while AH Plus and Apexit Plus showed a high significant difference. It was concluded that AH Plus had showed the highest shear bond strength in all the samples, while Gutta-Flow was the least. Additionally, AH Plus and Apexit Plus shear bond strengths were affected by the smear layer removal, while Gutta-Flow was not