

**The Effect of an Acid Environment on the
Microleakage of Different Root-end Filling
Materials**

(In vitro study)

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By

Haider A. Muhammed redha

B. D. S.

Supervised by

Prof. Dr. Majida K. Wali Al-Hashimi

B.D.S, MS (USA).

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جمادى الاولى

Abstract

Pulpal and apical pathologic inflammation or infection decreases tissue pH in the region surrounding the involved tooth. The root-end fillings are performed in the presence of such a decrease in the pH.

The purpose of this study was to compare, in vitro, the effect of an acid environment (pH 5.0) on the sealing ability of root-end filling materials (Amalgam, GIC, Super-EBA and MTA).

Ninety six single-rooted human extracted teeth received root canal treatment by gutta percha and zinc oxide eugenol root canal sealer, (the teeth were instrumented by step-back technique and obturated using lateral condensation technique). Then the teeth were put into a plastic container filled with sixty ml. of artificial saliva kept for five days. Then the apical three mm. of each root was resected under copious water spray using straight fissure carbide bur, in a high speed turbine handpiece perpendicular to the long axis of the tooth. A class I cavity was prepared in the resected root-ends to a depth of three mm. using a size 008 round steel bur in a slow speed handpiece.

The roots were divided into four groups of twenty four roots. The groups were filled with one of the root-end fillings; Amalgam, Glass ionomer cement, Super-EBA or Mineral trioxide aggregate. Then all the samples were stored in an incubator, 37 degrees centigrade at 100% humidity, for 48 hours. Then each group was divided into two subgroups, twelve roots of them were exposed to a pH of 5.0 (by immersing the samples in a plastic container containing sixty ml. of the acidic solution), for twenty four hours, and twelve teeth were exposed to a pH of 7.3 (by immersing the samples in a plastic container containing sixty ml. of the neutral solution), for twenty four hours.

All roots were immersed in pelikan ink for two days. Linear dye leakage was recorded. Data were statistically analyzed. Mineral trioxide aggregate provided the best seal followed by super-EBA and GIC. Amalgam scored the highest level of apical microleakage. The acid environment affected slightly the sealing ability of the used root-end filling materials, but it was statistically not significant.