

Comparison of Microleakage between Resin-based and Bioceramic-based Root Canal Sealers by Fluid Filtration Technique.

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Objectives: The aim of this study was to compare the microleakage between resin-based (AH Plus®) and bioceramic-based (EndoSequence BC Sealer®) root canal sealers using the fluid filtration technique.

Materials and methods: Seventy extracted human mandibular premolars resected 12 mm from the apex were instrumented to size 50/.04 using the Mtwo rotary system. They were then randomly divided into three experimental groups based on obturation technique and sealer (G1: AH Plus obturated by warm vertical compaction, G2: EndoSequence BC Sealer obturated by sealer-based technique, and G3: EndoSequence BC Sealer obturated by warm vertical compaction), and two control groups. After their completed obturations, the samples were stored in containers of 100 percent relative humidity for seven days. Microleakage was assessed using fluid filtration method, employing a pressure equivalent to 30 cmH₂O through a 1-mm diameter capillary tube. Statistical analysis was performed using the one-way ANOVA test followed by Dunnett T3 for multiple comparison tests at the 0.05 significance level.

Results: The leakage rate of EndoSequence BC Sealer by sealer-based technique group were statistically significantly higher than EndoSequence BC Sealer by warm vertical compaction group ($p = 0.013$). However, no significant difference was found between the AH Plus group and both the EndoSequence BC Sealer groups ($p > 0.05$).

Keywords: bioceramic, calcium silicate, fluid filtration, microleakage, root canal obturation

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Introduction

A complete three-dimensional filling of the entire root canal space is one of the key components for a successful root canal treatment. [1-4] Gutta-percha and root canal sealer are materials regularly used to seal off the root canal system. However, there are several different types of root canal sealers currently available in the market. Zinc-oxide-based and resin-based sealers are quite popular and have been used for many years. However, these two sealers have certain disadvantages, including dissolution in fluids

and shrinkage after setting. [5, 6] This resulted in the development of new root canal sealers including the bioceramic sealer to overcome these disadvantages. Bioceramic utilizes moisture to initiate its setting reaction, has a slight setting expansion and a high pH level. [7] This allows bioceramic to flow and adapt well to the root canal walls [8-10] and accounts for several of the listed criteria of an ideal root canal filling material as presented by Grossman. [11] Moreover, as bioceramic is bioactive, it can stimulate the production of bone and cementum. [12-14]

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