Evaluation of a New Biosilicate Sealer

(An In Vitro Study)

Thesis

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I take pride being your student"

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INTRODUCTION

Root canal sealers are fundamentally utilized to attain impervious 3 dimensional hermetic seal between the core filling material and root canal walls. They can be grouped according to their basic components, such as zinc oxide eugenol, calcium hydroxide, resin-based, glass ionomer, iodoform, silicon, and most recently tricalcium silicate based sealers such as BioRoot™ RCS.

According to Grossman, An ideal root canal sealer must attain the following properties: adequate radiopacity, possess reasonable working & setting time, insoluble in tissue fluids, provide excellent seal with minimal leakage, dimensionally stable, provide satisfactory adhesion with radicular dentin walls, biocompatible; and bacterio-static.

In 1993, a new class of dental materials have been introduced "*Tricalcium silicate cements*"; which have drawn eminent recognition with their favourable biologic behavior which is guaranteed with their alkaline pH, bioactivity, biologic seal and biocompatibility. In more recent years, tricalcium silicate root canal sealers have been introduced.

Among the first MTA-containing root canal sealers introduced was MTA Fillapex, which is available in paste-catalyst form. It was introduced with the aim of integrating the physico-chemical properties of a resin-based root canal sealer with the benefit of MTA's bioactivity; since it has been available for 7 years, it is the most studied MTA-containing root canal sealer.

BioRoot RCS is a pure bioactive tricalcium silicate sealer that was launched in 2015; it's available in powder-liquid form; and is made of pure

tricalcium silicate, zirconium oxide and excipients. It is claimed by the manyfacturer to be a bioactive breakthrough with outstanding sealing ability and physico-chemical properties.

Bioactive silicate sealers offer an alkaline pH, bioactivity through hydroxyapatite formation at the tooth-sealer interface and mineralization of dentinal structure, biocompatibility through high mineral purity and monomer free formulation reducing the risk of adverse tissue reaction, & finally it's sealing properties; where crystallization of the material takes place inside the dentin tubules creating a tight seal.

Physical tests are performed to analyze the properties of endodontic sealers, anticipating the clinical performance. American National Standards Institute/American Dental Association's (ANSI/ADA) requirements for sealers include radiopacity of at least 3 mm Al, solubility less than 3%, and a setting time that does not exceed 10% of the time specified by manufacturer's statement. Besides these requirements, root canal sealers should provide an adherence between gutta-percha and root canal walls, avoiding the occurrence of gaps at the sealer/dentin interface.