



Comparative Study of the Antimicrobial Effect of Three Irrigant Solutions (Chlorhexidine, Sodium Hypochlorite and Chlorhexidinated MUMS)

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ABSTRACT

Aim: To compare the antimicrobial effect of 2% chlorhexidine, 2.5% sodium hypochlorite and MUMS containing 2% chlorhexidine.

Materials and methods: All of the above irrigants were examined on *Enterococcus faecalis*, *Streptococcus mutans*, *Candida albicans*, *Lactobacillus casei* and *E.coli*. A total of 0.5 CC of each solution and 0.5 CC of McFarland solution bacterium were added to each examination tube. After 15, 30 and 45 minutes, colony count was performed for each tube. The difference in the number of bacteria indicated the effect taken by disinfectant material.

Results: MUMS containing chlorhexidine showed the antimicrobial properties just like chlorhexidine's effect against *E.coli*, *Streptococcus mutans*, *Candida albicans*, *Enterococcus faecalis* and *Lactobacillus casei* in preventing these entire microorganisms to incubate. Sodium hypochlorite was not effective against *Enterococcus faecalis* and *Candida albicans* incubated in 15, 30 and 45 minutes and *Enterococcus faecalis* in 15 minutes.

Conclusion: MUMS has antimicrobial properties similar to chlorhexidine.

Clinical significance: As MUMS containing chlorhexidine can transfer chlorhexidine through its own surfactant around apical area and it can open the dentinal tubules by its own chelator for more penetration of chlorhexidine, it may be a choice for canal irrigation.

Keywords: Antimicrobial activity, Irrigant, Chlorhexidine, Sodium hypochlorite, Microbial study.

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INTRODUCTION

The role of microorganisms in the pathogenesis of pulp and periradicular diseases has been established.^{1,2} The purpose of root canal preparation is removing microorganisms from the canal by using biomechanical procedures accompanied with the use of antimicrobial agents. For decades, investigators have searched for antimicrobial agents that are more effective in debridement of the root canal system.³⁻⁷

An ideal irrigant should be an effective germicide and fungicide, be nonirritating to the periapical tissues, remain stable in solution, have a prolonged antimicrobial effect, be active in the presence of blood, serum and protein derivatives of tissue, have low surface tension, not interfere with repair of periapical tissues, not stain tooth structure, be able to completely remove the smear layer, be able to disinfect the underlying dentin and its tubules and be relatively inexpensive. However, the common regimens in chemomechanical procedures using instrumentation and irrigation are not predictably effective in canal disinfection.^{8,9}

Sodium hypochlorite (NaOCl) is the most common endodontic irrigant used. It presents strong antimicrobial activity and ability to dissolve necrotic pulpal tissue, so is usually chosen as a suitable canal irrigant. However, it is cytotoxic when it contacts periapical tissues.¹⁰

Chlorhexidine (CHX) is another antimicrobial agent that has been advocated for disinfection of the root canal system.⁵ At low concentrations, it is bacteriostatic whereas at higher concentrations, it will cause the coagulation and precipitation of cytoplasm and therefore is bactericidal.¹¹

MUMS is a newly-developed irrigant that contains chelating agent and surfactant. Its chelator is ethylene diamine tetraacetic acid (EDTA) and surfactants are polyoxyethylene sorbitan monooleate (Tween 80) and