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Letter to Editor

Dentistry Section

Is Alexidine Really More Effective than Chlorhexidine?

TAHIR YUSUF NOORANI

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Dear Editor,

The article published in the July 2017 issue of Journal of Clinical and Diagnostic Research entitled "Alexidine: a Safer and an Effective Root Canal Irrigant than Chlorhexidine" by Surender LR et al., was an interesting read. Indeed, the use of alexidine as a possible replacement for chlorhexidine in endodontics is being widely investigated [1]. Additionally, the possibility of using combination of antimicrobials to effectively reduce the microbial load within the root canal system, while minimising the toxic effects to the periapical tissues is also being explored aggressively. Thus, this was a good study to determine the synergistic antimicrobial activity of sodium hypochlorite (NaOCl) and Alexidine (ALX) against one of the most important endodontic microorganisms, *Enterococcus faecalis* (*E. Faecalis*) [1]. However, we would like to share a few thoughts regarding this study. As described by the authors, commercially available alexidine dihydrochloride powder was dissolved in Dimethyl Sulfoxide (DMSO) to prepare a 2% ALX solution [1]. This 2% ALX solution was found to be more effective as an antibacterial agent then 2% Chlorhexidine (CHX). Nevertheless, other authors who used ALX solution prepared by mixing alexidine dihydrochloride powder in distilled water, found no significant difference in the antibacterial efficacy of 2% CHX and 1% ALX against *E. Faecalis* [2]. Thus, it can be speculated that the improved antimicrobial efficacy of 2% ALX demonstrated by Surender LR et al., could be possibly because DMSO was used as a solvent instead of distilled water to prepare a 2% ALX solution [1]. It is worth noting that DMSO itself is effective in preventing biofilm formation [3]. Furthermore, DMSO improves the antibacterial effectiveness of certain antiseptics when used as a solvent [4]. Moreover, in another study, the antibacterial efficacy of 2% ALX against *Streptococcus mutans* was not found to be significantly different from 2% CHX [5]. Hence, to test and compare the antimicrobial efficacy, ALX solution should preferably be prepared by mixing ALX powder in distilled water.

Surender LR et al., also tested the antimicrobial efficacy of the combination ALX and NaOCl against *E. Faecalis*. Indeed, this mixture unlike the mixture of NaOCl and CHX, does not result in the formation of a toxic precipitate. However, the mixture of ALX and NaOCl results in a yellow coloured solution [1,6]. This yellow coloured solution may be clinically significant as it may potentially discolour the tooth structure. Hence, the use of an intermediate solution such a saline or distilled water is advisable to avoid the mixing of NaOCl and ALX within pulp chamber or the root canal system.

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AUTHOR'S REPLY

CHX is commercially available, ALX is not commercially available. The solvent used for preparation of ALX solution was in according to the manufactures instructions and with reference to previous publications.

Following are various manufacturers of ALX who have stated that "ALX soluble in DMSO"

- www.sigmaaldrich.com/catalog/product/sigma/a8986
- https://www.rndsystems.com. Protein Tyrosine Phosphatase Inhibitors
- www.abcam.com/alexidine-dihydrochloride-ab219400.html
- https://www.apexbt.com/alexidine-dihydrochloride.html

Alexidine and CHX have same bisguanide backbone; para-chloro aniline end groups of CHX replaced by ethyl-hexyl substituents in ALX. ALX has greater affinity for major bacterial virulence factors than CHX, as ALX contains two hydrophilic ethyl hexyl groups in its structure and CHX as p chlorophenyl end groups. Ideal solvents for ALX are organic solvents like DMSO. A particular compound would express its properties better if it is dissolved in a correct solvent. Dissolving ALX in distilled water might reduce the expression of its properties. Cytotoxicity test for ALX are foreway. Hence further research is required.

PARTICULARS OF CONTRIBUTORS:
1. Senior Lecturer, Department of Conservative Dentistry, School of Dental Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Tahir Yusuf Noorani,
Senior Lecturer, Department of Conservative Dentistry, School of Dental Sciences, Universiti Sains Malaysia, Health Campus,
16150 Kubang Kerian, Kelantan, Malaysia.
E-mail: dentaltahir@yahoo.com

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