The Effect of QMix, an Experimental Antimicrobial Root Canal Irrigant, on Removal of Canal Wall Smear Layer and Debris

To the Editor:

An irrigating agent with the capability to remove smear layer without causing erosion of the radicular dentin and at the same time is effective against the microbial biofilms can be considered paramount. Hence it was with keen interest that the article by Dai et al on an experimental irrigant called QMix was read (1). The effort taken by the authors to compare QMix with the currently used chelating agents is well appreciated. However, there are a few queries that need clarification.

In the above mentioned article, as the effectiveness of QMix was to be compared with 17% EDTA and BioPure MTAD, the concentration of sodium hypochlorite (NaOCl) used as the initial irrigant should have been 1.3% for all the groups. Besides, the use of 5.25% NaOCl is also controversial as it can cause severe irritation when inadvertently extruded into the periapical area (2).

When NaOCl comes in contact with a bisbiguanide (a component of QMix) it is shown to form a precipitate. This precipitate could have interfered with the debris score. Mixing bisbiguanide and polyaminocarboxylic acid calcium-chelating agent (both components of QMix) is thought to reduce the ability of the chelating agent to remove the smear layer (3). The relevance of the debris score, in addition to the smear layer score in this study, is questionable as smear layer is nothing but organic and organic debris present on the root canal surface after instrumentation (4). Moreover, the poor debris score with BioPure MTAD, even though it was very effective in removing the smear layer from the apical region, is very intriguing. Additionally, the better removal of debris in the apical third area by distilled water as compared to the other groups needs further clarification (see Figure 2 in the original article) (1). Scanning electron microscopic images would have explained it better. A printing error was also spotted in the first paragraph of page 81 and in the legend of Table 1 on page 83, where JR was written instead of FR with respect to Group 4 and 5.

It is mentioned in the article that Cochrane–Mantel–Haenzel (CMH) method was used to test for significant difference among treatment groups, separately taking into account the clustered nature of the data. The purpose of the CMH is to test whether the response is conditionally independent of the explanatory variable when adjusting for the control variable. The analysis produces CMH statistics only for 2 × 2 tables (5). Hence, the application of this test for this study is unclear. Furthermore, the Bonferroni correction (perhaps more accurately described as the Dunn–Bonferroni correction) is a method used to address the problem of multiple comparisons. For the given set of qualitative data, the usage of Bonferroni correction is unclear.

We would also like to know from the authors the exact composition of this newly introduced irrigating agent (QMix), which seems promising as an alternate to the commonly used chelating agents.

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References

Reply to Drs Pai and Thomas

We thank Dr Sawathi Pai and Dr Manuel Thomas for their interest in our article, “The Effect of QMix, an Experimental Antimicrobial Root Canal Irrigant, on Removal of Canal Wall Smear Layer and Debris,” which was published in the January 2011 issue of Journal of Endodontics. We are responding to some of the issues raised by them in their Letter to the Editor.

1. “In the above mentioned article, as the effectiveness of QMix was to be compared with 17% EDTA and BioPure MTAD, the concentration of sodium hypochlorite (NaOCl) used as the initial irrigant should have been 1.3% for all the groups.”

Response: The use of non-thermally activated 5.25% sodium hypochlorite as initial irrigant represents the current clinical technique taught in many dental schools in North America, including that of the corresponding author. Consequently, it was considered the relevant concentration for comparison against the other secondary irrigants. We used BioPure MTAD (Dentsply Tulsa Dental Specialties, Tulsa, OK) in the manner recommended by the manufacturer. BioPure MTAD is the only solution that specifically called for the use of 1.3% sodium hypochlorite as the initial irrigant (1). We could not use 5.25% sodium hypochlorite as the initial irrigant for BioPure MTAD as it forms a purple precipitate when it comes into contact with a high concentration of sodium hypochlorite (2).

2. “Besides, the use of 5.25% NaOCl is also controversial as it can cause severe irritation when inadvertently extruded into the periapical area.”

Response: The authors are in agreement with the statement made by Drs Pai and Thomas that 5.25% sodium hypochlorite may cause severe irritation when inadvertently extruded into the periapical area. Care should be taken to avoid inadvertent extrusion of sodium hypochlorite into the periapical area. For example, 5.25% sodium hypochlorite should not be used in a tooth with an open apex.

3. “When NaOCl comes in contact with a bisbiguanide (a component of QMix) it is shown to form a precipitate. This precipitate could have interfered with the debris score.”

Response: We include the response provided by the manufacturer:“The concentration of bisbiguanide in QMix is far lower than commercially-available irrigating solutions of the same antimicrobial agent. Contact tests conducted by the developer also confirmed the absence of this type of precipitate. As with other irrigants, however, a saline, distilled water or absolute alcohol rinse between irrigants is recommended to minimize chemical interactions. This recommendation is also included in the Directions for Use for the commercial QMix solution.”

4. “Mixing bisbiguanide and polyaminocarboxylic acid calcium-chelating agent