Reviewer’s report

Title: Efficacy of Four Different Irrigation Techniques Combined with 60oC 3% Sodium Hypochlorite and 17% EDTA in Smear Layer Removal

Version: 6 Date: 13 June 2014

Reviewer: Ericka Pinheiro

Reviewer’s report:

This study aimed to compare the efficacy in smear layer removal of four different irrigation techniques combined with 60ºC 3% NaOCl during root canal preparation and 17% EDTA as final irrigation. In general, the paper is well written, but some points should be discussed before publication. The first and most important point is related to the group of passive ultrasonic irrigation (PUI). There is a difference between PUI and ultrasonic irrigation (UI), since the first is usually performed as final irrigation after root canal shaping to allow acoustic microstreaming or cavitation. As the ultrasonic activation of the irrigant was performed mainly during the root canal preparation in this study, I would suggest changing the name of the group to UI. These aspects may have direct influence in the results and should be discussed. The second point is the fact that the ultrasonic activation may rise the temperature of the 60ºC sodium hypochlorite solution, which should be tested in order to avoid damage the periodontal ligament.

Major Compulsory Revisions

• Methods:

The irrigation protocol used during root canal preparation should be described with more details. It is not clear if after each instrument, the irrigation was done in conjunction with an aspiration system to remove root canal debris.

o Lines 77: I would suggest the change of the term PUI (passive ultrasonic irrigation) to UI (ultrasonic irrigation). As the ultrasonic activation was used during the root canal shaping, the increased contact with the canal wall may have excluded transient cavitation. In contrast, passive ultrasonic irrigation is usually performed after root canal shaping to allow acoustic microstreaming or cavitation. These aspects should also be pointed out in the DISCUSSION section.

o Lines 119-121: As four examiners evaluated the images, an inter-examiner reliability test should be performed. Moreover, the Kappa value should be included in the text.

• Results:

o Tables 1 and 2 should be merged in only one table, describing the mean and standard deviation values of smear layer scores in the three canal thirds and total of the thirds.
• Discussion:
In general, the comparison among different groups are discussed as the total thirds means of smear layer. However, the results of specific thirds should also be stressed in the text. There was no difference in the apical and middle thirds among the groups. The difference found was in the coronal third, where the NaviTip FX group was better than the PUI group. The reasons for this difference should be more deeply discussed, including aspects as acoustic microstreaming or cavitation, which play an important role in PUI. Moreover, the advantages of using smooth wires instead of files during PUI to prevent cutting the root canal wall should be discussed.
The ultrasonic activation may rise the temperature of a solution. It would be advisable to test the temperature rises of the 60°C sodium hypochlorite after 1 min ultrasonic activation in the root canal and in the external root surface. These aspects should be discussed in the text.

• Conclusion:
The conclusion emphasizes the control group and not the four irrigation techniques tested. The authors should rewrite the first sentences in the conclusion section (lines 195 to 198) and in the abstract. In these sentences, it should be clear that the 60°C 3% NaOCl was used as irrigant during root canal preparation. The term ultrasonic irrigation should also replace the PUI. Additionally, the idea of the last three sentences (lines 198 to 200) should be emphasized in the abstract.

Minor Essential Revisions
• Abstract, methods section: the system used to root canal preparation should be included in the abstract.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests.