Author's response to reviews

Title: Use of artificial primary teeth for endodontic laboratory research: experiments related to canal length determination

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Answers to Reviewers

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We are very grateful for the comments and suggestions provided. In order to facilitate the review process, each comment is followed by the respective answer.

Comments to the Author

Reviewer reports:

Peter Bottenberg, PhD (Reviewer 1):

The manuscript describes the evaluation of root canal length measurements on artificial deciduous teeth. Using 2 observers and different techniques these measurements were compared with natural extracted teeth.
Unfortunately the authors (one of which is the producer of the teeth) do not provide much information on these teeth. They state a patent (probably written in Portuguese) which is not accessible to the public. Nor did I find much data on the internet concerning that company. However, for a technical paper as this, the main interest would be the true nature of these teeth. If the producer does have an economic or industrial interest in not publishing these data, this would be a serious conflict of interest. Alternatively, the authors should either provide an accessible document or wait till the end of the patent procedure to publish their data.

Answer: Dear Dr. Bottenberg

We are very grateful for the suggestions provided. Concerning this first comment, JCP Imparato is not a producer. He only participated during the creation process with the manufacturers, but he does not have financial interests, nor is co-applicant in the patent application. We are very sorry for the wrong information in the first version of the text. Actually, the patent pending process is in Portuguese, but we do not have access to details about the teeth. The unique author of the patent application is Mr. Ivo Mori, who is the owner of the company that produces the teeth (www.imdobrasil.com.br, website in Portuguese. Our interest was to show the feasibility in using artificial teeth as a model for research on endodontic treatment in primary teeth, and we used these teeth because they are easier to obtain. The manufacturer provided the teeth, but none of the authors has financial interests or relationship with the company. In the revised text, we clarified this information (page 14. Competing interests)

Furthermore, there were some more problems:

1) Was apical region of the natural teeth different of the artificial ones?

Answer: As we selected some natural teeth with initial root resorption (as stated in page 4), and the artificial teeth simulate teeth with entire roots, small differences could be observed. However, we believe that these differences did not influence significantly the results, as it is expected that the methods are accurate in primary teeth with initial resorption (Nelson-Filho et al., Aust Endod J 2010; 36:105; Angwaravong et al. Int Endod J 2009; 42:115; Mello-Moura et al. Int Endod J 2010;43:142). However, we added this information in the Material and methods section (page 4, 3rd paragraph, line 6) and Discussion (page 12, 4th paragraph).

2) Did all artificial teeth of the same anatomical location have an identical anatomy? This on itself would mean a very close spreading of the length estimation of this group. So how comes the variability?

Answer: Although the artificial teeth have the same root length, they present many internal anatomical differences, probably due to the variability on manufacturing process. Other possible explanation for the variability on the results of radiographic method could be differences related to the radiopacity between artificial teeth. These explanations were added in the revised text (page 12, last paragraph).
3) Is the "floral foam" method validated? If so, reference or validation data should be supplied.

Answer: Yes, it is. A previous study has demonstrated that the mean differences between root canal length assessed with an electronic apex locator in teeth embedded in floral foam and the actual length were less than 0.3 mm. This reference was added in the revised text (reference number 9).

4) The reference standard means that the tooth is handed over from one operator to the other. What would the effect of this be on the stability of the measurement? Furthermore, one paragraph mentions "coronal reference" and the next "canal entrance" which as I understand it, would be the floor of the pulp chamber.

Answer: We did not believe that this procedure can affect the stability of the measurements. Moreover, all in vitro studies using permanent or primary have used this procedure as reference standard. With regard the second comment, you are right. We removed the expression “canal entrance (page 6, third paragraph, line 5) because the correct is “coronal reference”.

5) Probably a part of the variability is observer/operator effect. However, with just 2 observers, this effect cannot be determined.

Answer: As we considered only one series of measurements to calculate the accuracy parameters, the variability observed was due to the method.

6) 95% CI is more suitable for normally distributed data. Instead of table 5 (which gives the descriptive data and should come first), supply a box-whisker diagram.

Answer: Agreed. We replaced the table 5 for the figure 2 containing the Box-and-Whisker plots.

7) If the measurement error is 0.5 mm, any difference near to that value would be attributable to the error. This should have been taken into account in the statistical procedure.

Furthermore, use of language needs a thorough polishing up.

Answer: Although the median of radiographic examination in natural posterior teeth, for example, was 0.5, the mean was higher (more than 1.0 mm). Moreover, the statistical procedure used (Friedman test) does not consider nor the mean, neither the median. The method considers the rank position of the measures. Therefore, in general, radiographic method presented more assessments with higher differences than the apex locators. We agreed with the reviewer that the differences, even for the radiographic methods, are very small; however, this point was discussed in the text, when we affirm that the radiographic method presented clinically acceptable results (Discussion, page 11, last paragraph).
Eduardo Fernández (Reviewer 2): Good idea

Please add the statistical powers of comparisons in each table

I think that looking at the data table and the sample size, power should give low to accept the hypothesis raised

Please confirm this or rebuttal with more sample

Answer: Dear Dr. Fernández

We are very grateful for the suggestions provided. Concerning your comment, the sample present statistical power. For example, even with the large confidence interval obtained with radiographic method in artificial posterior teeth, we observed significant differences comparing with the other methods (please, see the Table 4). Moreover, in the figure 2, we observed statistical differences between radiographic method and apex locators with differences smaller than 1.0 mm. Therefore, as we observed statistical differences in some occasions, we can assume that the sample present statistical power. Other important point is that the present manuscript report findings from an accuracy study. Therefore, the values and confidence intervals are more important that the statistical comparisons, as stated in the STARD initiative.

We would like to thank you much for your kindly contribution to the manuscript.

Sincerely Yours

The authors