Author's response to reviews

Title: Comparison of the efficacy of nickel-titanium rotary systems with or without the retreatment instruments in the removal of gutta-percha in the apical third

Authors:

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Author's response to reviews: see over
Rio de Janeiro, July 24, 2014

Dear Dr. Giulio Gavini,

We received the comments of the reviewers concerning our paper entitled " Nickel-titanium rotary systems with or without the corresponding retreatment instruments in removing gutta-percha". The following is a point by point response to reviewer. Changes in text are in blue.

Reviewer 1

Reviewer comment:

The title describes adequately the content of the paper, although the authors should add the term ‘comparison” e.g. “Comparison of the efficacy of nickel-titanium rotary systems with or without the retreatment instruments in the removal of gutta-percha”. In addition, there is another concern about the title: it is advisable to add the information that the evaluation of gutta-percha removal was performed only in the apical third. e.g. “Comparison of the efficacy of nickel-titanium rotary systems with or without the retreatment instruments in the removal of gutta-percha in the apical third.”

**Authors’ response:** We change the title as suggested. Thank you for your suggestion.

Reviewer comment:

Abstract

1) In the abstract section, it is necessary to describe better the abbreviations of the groups.

**Authors’ response:** The abbreviations of the groups were added after the complete description of the systems.

2) It is advisable to add the information that the evaluation of gutta-percha removal was performed only in the apical third.

**Authors’ response:** This information was added in the purpose of the study.

3) Further, the terms “no advantage” are used inappropriately. The methodology of the study does not permit to draw this conclusion, once other variables such as time for gutta-percha removal was not evaluated. It is advisable to conclude that considering the methodology used, remaining filling material was found in all hemisections, regardless of the retreatment technique and PT or M2 were as effective as PTr/PT our M2r/M2.

**Authors’ response:** We followed your suggestion. It is better than our sentence. Thank you.
Introduction
1) Second paragraph of initial preparation - fill canal sealer (Technew, Rio de Janeiro, Brazil) should be in capital letters, once is a sealer brand;
Authors’ response: Modified as suggested.
2) The authors should specify the meaning of the abbreviation “SAF”.
Authors’ response: Modified as suggested.

MAJOR COMPULSORY REVISIONS
Reviewer comment:
Abstract
1) Experimental groups are not well specified in abstract.
Authors’ response: we added a better description as suggested.
2) In the sentence “in group PT/M2… to a M2 40”, the correct is: “in groups PT/M2 …”
Authors’ response: Done
3) It is essential to mention that the study was performed in extracted mandibular incisors; it would be noteworthy to emphasize that this is an ex vivo study.
Authors’ response: Done
4) The authors should specify the p-value.
Authors’ response: We added the p-value in the abstract. Thank you.
5) In the sentence “Remaining material was found in all hemisections and there was no significant difference between the groups”, the term statistically is missing.
Authors’ response: We corrected. Thank you.

Reviewer comment:
Introduction
1) The material manufacturers should be named and their locations should be provided in the correct format (company, town/city, state, country).
Authors’ response: We performed all corrections. One observation: St. Gallen, Switzerland is the abbreviation form of the Canton (State in Switzerland).
2) First paragraph - The main objective of endodontic retreatment is not only to restore the health of the periapical tissues; for example, endodontic retreatment may be necessary in cases of oral exposure to the oral cavity.
Authors’ response: the sentence was reformulated as follow: “to restore or prevent the health of the periapical tissues”
3) Second paragraph - “PTr and hand files did not differ in cleaning" - the word “ability” should be added at the end of this sentence.
Authors’ response: modified as suggested. Thank you.
4) Third paragraph - Tasdemir et al. compared ProTaper, Mtwo, Hedström files and R-Endo (an exclusive system for retreatment) in removal gutta- percha – in this sentence, the correct word is “removing”, not “removal”.
Authors’ response: modified as suggested. Thank you.
5) Third paragraph - “The teeth used were cleared for the assessment of areas with remaining material” - This sentence should be revised because it is unclear.
Authors’ response: The sentence was reformulated as follow: “The teeth used in the study were rendered transparent and the area of remaining filling material was measured using computer software”. Thank you.
6) Forth paragraph - “Therefore, this in vitro study compared ProTaper and Mtwo instruments”- the word “efficacy” should be added at the end of this sentence. **Authors’ response:** modified as suggested. Thank you.

Reviewer comment:
Material and methods
1) The correct name of this section is “Methods”, according to instructions of BMC Oral Health Guidelines
**Authors’ response:** corrected. Thank you.
2) First paragraph - Sixty human extracted mandibular incisors with formed apices — the words “completely developed” should be used instead of “formed”.
**Authors’ response:** corrected. Thank you.
3) Initial preparation - “Hand stainless steel K-files preparation in the apical third up to a 0.30 mm in WL” – the authors should describe file tip as “#30.”
**Authors’ response:** corrected. Thank you.
4) This sentence should be revised and the proper verb is “was”: “maintenance of the apical foramen patent with a #10-#20 K-file were performed.”
**Authors’ response:** Two sentences were revised to clarify the text as suggested. See below.
“During the preparation, abundant and frequent irrigation with 2.5% NaOCl (usually 1-2 mL after each file size) were performed. After irrigation, apical patency was verified by introducing a #10-#20 K-file in the canal until its tip was visualized at the apical foramen.”
5) The volume of EDTA used was not specified; why was not any agitation method (passive ultrasonic irrigation, for example) of the solution performed?
**Authors’ response:** The volume of EDTA was specified. The EDTA solution was not agitated, but was renewed after each minute. We will take into account the agitation of EDTA in further studies. Thank you.
6) In the study, teeth were stored in 100% humidity at 37°C for 14 days to allow for the sealer to set. Articles that evaluate desobturation of extracted teeth usually store at 37°C for 30 days before removal of gutta-percha, such as in the following study: Rios et al. Efficacy of 2 reciprocating systems compared with a rotary retreatment system for gutta-percha removal. J Endod. 2014 Apr;40(4):543-6.
7) After drying and before stereomicroscope evaluation, the teeth were again sectioned at 8 mm from the apex, perpendicular to the long axis and the coronal portion of roots was discarded. It was selected the tool Region of Interest ROI to restrict the analysis to the apical 5 mm. Why were not the samples sectioned at the apical 5 mm? Once the samples were cut at 8 mm, the issue should be discussed on the manuscript.
**Authors’ response:** The apical 8 mm (approximately) was sectioned, because the thickness of the disc. If we cut at 5 mm, we could not ensure the exactly size. With the ROI tool we selected the exactly 5 mm to evaluation. The description was reformulated in methods section as follow:
For the later evaluation of exactly apical 5 mm (see below), the teeth were sectioned in 8 mm from the apex, approximately, perpendicular to the long axis, with a double-sided diamond disc, without refrigeration.

We think that is more appropriate to insert this explanation in methods section.

8) The volume and application method of solvent used should be specified.

Authors’ response: The information was added as suggested. Thank you.

9) The movement used for instrumentation (“some pressure”) with rotary instruments is not appropriate and is not in accordance with the nomenclature used by the literature: the correct movement for ProTaper instruments is “in and out with brushing” and Mtwo instruments should be used with “brushing” movements.

Authors’ response: “some pressure” was used as synonymous of “light resistance” used by the manufacturer. As the same way when we used “lateral pressure”, in fact we try to describe the brushing movement. We followed the manufacturer’s recommendations but we agree that our description can confuse the reader. Now we reformulate the description of the applied movements take into account the reviewer’s comments. With respect to Mtwo, the same movement was applied, because to brush we need combined in and out motion. Thank you for your consideration. The description now is better.

10) The torque used for all rotary instruments was too low. Articles that evaluate ProTaper Universal Retreatment used ProTaper Universal Retreatment instruments at a constant speed of 500 rpm for D1 and 400 rpm for D2 and D3 with a torque of 3 N.cm, such as in the following study: Rios et al. (2014). These speed and torque were established by previous analyses and followed manufacturer’s recommendations.

Authors’ response: the torque and speed used in our study were decided taking into account the manufacturer’s recommendations (that are: PT should be use at a speed of 150 – 350 rpm, and Mtwo in 250 – 350 rpm; PTr should be used in 500 to 700 rpm for removing gutta percha or thermafil obturators), but there are some small variations comparing the manufacture’s documents (links are below). We decided use a standard as similar as possible with manufacturer’s recommendations.


12) The description of stereomicroscope analysis could be less detailed.

Authors’ response: The follow description was removed following the reviewer suggestion: “The stereomicroscope was adjusted as follows: Direct Illumination Level and the Magnification Zoom Lens set at 1. The indirect illumination through the handling arms optical fiber was initially adjusted to remove shaded areas and maintained for all groups”.

Reviewer comment:
Results
1) The first sentence is not a result “All root canal fillings showed a satisfactory quality without apparent radiographic differences.”

Authors’ response: this sentence was removed. Thank you for your consideration.

2) In the sentence: the total canal area was 7.17 mm, is representing the mean total canal area?
Authors´ response: yes, exactly. Now, we specified to make clear.

Discussion

1) The articles mentioned in the discussion section are interesting, and they support the objective of the manuscript, although there is no recent literature on the topic.

Authors´ response: we added a sentence in discussion with a recent reference.

“Furthermore, taking into account that in the present study, the number of instruments ranged 6 to 9 depending of the group, the number of instruments in a retreatment technique may not have great influence on gutta-percha removal. This is in agreement with a recent study that did not find statistical difference comparing two single file techniques with PTr in gutta-percha removal (Rios, 2014).”

2) What is the meaning of “cleared teeth” on 5th paragraph of the discussion section?

Authors´ response: it means “rendered transparent teeth”. We replace.

3) It is noteworthy to discuss the influence of the obturation technique on the removal efficacy of gutta-percha and sealer.

Authors´ response: We thought, but there are two reasons for not doing: 1. The objective of the study was to compare techniques, so since all groups are filled with the same technique, filling technique did not influence the results; 2. the size of the discussion section is already considerable. Hope you understand.

4) The use of solvent is controversy, once according to previous studies (Rios et al. Efficacy of 2 reciprocating systems compared with a rotary retreatment system for gutta-percha removal. J Endod. 2014 Apr;40(4):543-6, its known that solvents such as eucalyptol have been used to facilitate the process, but these should be used with care given their cytotoxic potential and potential for forming a residual film of softened gutta-percha on the dentin walls. According to the study of Kumar et al. (2014) the combined use of solvents along with hand or rotary files complicates debridement, because these solvents dissolve, flow into, and coat inaccessible canal irregularities or penetrate into the periradicular tissues (Kumar et al. A comparative evaluation of efficacy of ProTaper Universal rotary retreatment system for gutta-percha removal with or without a solvent. Contemp Clin Dent. 2012 Sep; S160-3). The authors should discuss this topic in the discussion section.

Authors´ response: A discussion about solvents was added as suggested.

5) The section Conclusions is missing.

Authors´ response: done

References

6) The authors should update the references. The most recent are from 2012.

Authors´ response: done

The English was revised
Reviewer 2

1. In the results the authors have not mentioned in detail tests of statistical analysis performed and what type of software used for statistical analysis??

Authors’ response: The statistical program and the confidence level were added in the materials section. Thank you for your consideration.

2. What is the reason for choosing Stereomicroscope for quantitative analysis?

Authors’ response: The stereomicroscope was chosen because with this method we have a direct visualization of remaining filling material with magnification and it is a well established method in the literature for this type of analysis.

3. In M2 group why smaller amount of material removed compared to PT Group??

Authors’ response: Even if in absolute values M2 provided more cleaned canals, the difference was not significant. Nevertheless, the values are not so different. Therefore, we conclude that they had a similar performance. The result of statistical analysis does not allow inferring that a group was better than another.

4. what might be the reason for lesser removal of material with Retreatment instruments compared to other groups and quote any supporting articles??

Authors’ response: Please, consider the anterior response.

5. Mention recent articles (2013,2014) relevant to this in-vitro study

Authors’ response: done.

We are now returning the revised manuscript.
Thank you for your attention.
Best regards,

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Professor of Endodontics
Estácio de Sá University