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OPEN PEER REVIEW

Comparative Evaluation of Dentinal Microcrack Using M3 ProGold, Mtwo Rotary File and Hand File in Root Canal Therapy: An In-Vitro Study

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SUBMITTED	REVISED	ACCEPTED	DOI
24 Jul 2024	27 Jan 2025	3 Feb 2025	10.5812/mejrh-151650

About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

More about open peer review: brieflands.com/knowledgebase/opr

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1 Original submission

5 comments · 18 Aug 2024 – 9 Sep 2024

Referee 1 Reviewer

ACCEPT 18 Aug 2024

* 1) Is the article within the scope of the journal? yes
* 2) Does the article have novelty? yes
* Title
* 3) Does the title reflect the content appropriately? yes
* 4) Is there any abbreviation in the title? No
* Abstract
* 5) Is there a structured Abstract? yes
* 6) Are Keywords (3-10) selected from MeSH? No, they should be modified according to MeSH.
* Introduction
* 7) Clarity of the objectives/hypotheses? The hypothesis is clear
* 8) Does the Introduction include: "What we know," "What we don't know" and "Aims"? yes
* Materials And Methods
* 9) Is the selection of participants clearly described? Yes, it is very clear.
* 10) Study Design Described Sufficiently? yes
* 11) Adequacy of the sample studied? yes
* 12) Subjects Representative of Target Population? yes
* 13) Provided sample size calculation or justification? yes
* 14) Control Subjects Appropriate? yes
* 15) Power of study declared? Yes
* 16) Reported actual P values for primary analyses? Yes
* 17) Blinding of Investigators (if applicable)? yes
* 18) Blinding of subjects (if applicable)? Not applicable
* 19) Are the methods and apparatus identified (with the manufacturer's name and address given in parentheses)? Yes
* 20) Are procedures identified in sufficient detail to allow other workers to reproduce the results? yes
* 21) Are all drugs and chemicals used precisely identified, including generic name(s), dose(s), and route(s) of administration? All drugs, materials and devices are authentic and identifiable
* 22) Inclusion/Exclusion Criteria Explained? Yes
* 23) Appropriate Statistical Analysis? Yes
* Results
* 24) Appropriateness, clarity, and adequacy of the Tables and Figures? They are completely correct and accurate
* 25) Are results presented in a logical sequence in the text, tables, and illustrations, giving the main or most important findings? They have been presented.
* 26) Duplicate data in graphs and tables? Yes
* 27) Are technical terms in statistics used nontechnically, such as "random" (which implies a randomizing device), "normal," "significant," "correlations," and "sample."?
* Discussion
* 28) Conclusion justified & substantiated? yes
* 29) Analysis supports Conclusion? yes
* References

* 30) Proper Writing of the References? yes
* 31) References for the last five years? yes

Referee 2 Reviewer — MAJOR REVISION — 24 Aug 2024

In this study, the authors investigated the incidence of dentinal microcracks using M3 ProGold, Mtwo Rotary File, and Hand File in an in vitro study. The research has good data accumulation and an interesting research topic, but it seems to need major revisions, especially in the Methods and Results sections (statistical analysis and a reference for the minimum acceptable success rate).

Major comments
1. The title of your study should be changed. You need more data to calculate the incidence.
2. In the sample size calculation, write the minimum acceptable success rate (π) with a reference for Gehan's Procedure.
3. Write the time and location of your study in the Methods section.
4. The statistical analysis section is very brief.
6. Write the statistical tests under the tables.
4. Were your participants selected using census sampling? Explain.

Minor comments
1. The abbreviation "RCT" must be changed. "RCT" is known as "Randomized controlled trial".

Referee 3 Reviewer — MAJOR REVISION — 31 Aug 2024

The file is uploaded.

Associate Editor — MAJOR REVISION — 9 Sep 2024

Dear EIC,
The manuscript has been reviewed, and there are some comments that the authors should address. According to the comments, the document needs major revision.

Editor-in-Chief — MAJOR REVISION — 9 Sep 2024

Dear Authors
According to the reviewers' and associate editor's comments, your article needs major revision. When revising your manuscript, please consider all issues mentioned in the reviewers' comments carefully: please outline every change made in response to their comments and submit the required files.

2

Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

“Peer Review”

Manuscript ID: 151650
Title: Comparative Evaluation of Dentinal Microcrack using M3 ProGold, Mtwo Rotary File and Hand file in Root Canal Therapy: An In-Vitro Study

Dear Dr. Ehsani,

Thank you for giving me the opportunity to submit a revised draft of my manuscript. I truly appreciate the time and effort that both you and the reviewers have invested in providing thoughtful and valuable feedback. I am also grateful to the reviewers for their insightful comments and suggestions.

In response to the feedback, I have made the necessary revisions to address the reviewers' concerns, and these changes have been clearly highlighted within the manuscript. Additionally, I have provided a detailed, point-by-point response to each of the reviewers' comments. For sections where no concerns were raised according to the checklist, no changes were made.

Reviewer comments
****
Reviewer 1:

* 1) Is the article within the scope of the journal? yes
* 2) Does the article have novelty? yes
* Title
* 3) Does the title reflect the content appropriately? yes
* 4) Is there any abbreviation in the title? No
* Abstract
* 5) Is there a structured Abstract? yes
* 6) Are Keywords (3-10) selected from MESH? No, It should be modified according to the Mesh

Response: Thank you for your comment. The keywords have been modified based on MESH.

* Introduction
* 7) Clarity of the objectives/hypotheses? The hypothesis is clear.
* 8) Does Introduction include: “What we know,” “What we don’t know” and “Aims”? yes
* Materials And Methods
* 9) Clearly describe the selection of participants? yes, It is very clear
* 10) Study Design Described Sufficiently? yes
* 11) Adequacy of the sample studied? yes
* 12) Subjects Representative of Target Population? yes
* 13) Provided sample size calculation or justification? yes
* 14) Control Subjects Appropriate? yes
* 15) Power of study declared? Yes
* 16) Reported actual P values for primary analyses? Yes

* 17) Blinding of Investigators (if applicable)? yes
* 18) Blinding of subjects (if applicable)? No applicable
* 19) Identify the methods apparatus (give the manufacturer's name and address in parentheses)? Yes
* 20) Identify procedures in sufficient detail to allow other workers to reproduce the results? yes
* 21) Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration? All drugs, materials and devices are authentic and identifiable
* 22) Inclusion/Exclusion Criteria Explained? Yes
* 23) Appropriate Statistical Analysis? Yes
* Results
* 24) Appropriateness, clarity, and adequacy of the Tables and Figures? It is completely correct and accurate.
* 25) Present results in logical sequence in the text, tables, and illustrations, giving the main or most important findings? has provided
* 26) Duplicate data in graphs and tables? Yes
* 27) Use technical terms as non-technical in statistics, such as "random" (which implies a randomizing device), "normal," "significant," "correlations," and "sample."?
* Discussion
* 28) Conclusion justified & substantiated? yes
* 29) Analysis supports Conclusion? yes
* References
* 30) Proper Writing of the References? yes
* 31) References for the last five years? yes

Reviewer 2:

In this study, the authors investigated the Incidence of Dentinal Microcrack using M3 ProGold, Mtwo Rotary File, and Hand File in An In-Vitro Study. The research has good data accumulation and interesting research topic, But it seems to needs major revisions especially in Methods and Results (statistical analysis, success rate acceptable reference) sections.

Response: Thank you for your comment. Methods and Results section has been revised based on your comments.

Major comments

1. The title of your study should be changed. You need more data to calculate the incidence.

Response: Thank you for your comment. The title of the study has changed.

2. In the sample size calculation, write the Minimum success rate acceptable (π) with reference in the Gehan's Procedure.

Response: Thank you for your comment. The minimum success rate acceptable (π) and reference have been added to the method section.

3. Write the time and also location of your study in the Methods section.

Response: Thank you for your comment. The time and location added in methods.

4. The statistical analysis section is very brief.

Response: Thank you for your comment. More details have been added to the statistical analysis section.

6. Write the statistical tests under tables.

Response: Thank you for your comment, the statistical tests has been added.

4. Your participants are from census of sampling? Explain.

Response: Thank you for your comment. The sampling methods and the reasons behind them have been included in the manuscript.

Line 13 need reference I think..

Response: Thank you for your comment, references have been added.

Minor comments

1. The abbreviation "RCT" must be changed. "RCT" is known as "Randomized controlled trial".

Response: Thank you for your comment, the abbreviation has been replaced by root canal therapy.

Reviewer 3:

file is upload

Response: Thank you for your comment, the manuscript has been revised based on your comments.

Associate Editor's Comments:

Associate Editor 1:
Dear EIC,
The manuscript is studied, and there are some comments that the authors should address. According to the comments, the document needs major revision.

EIC Decision:

Dear Authors
According to the reviewers and associated editor’s comments, your article needs to be revised majorly. When revising your manuscript, please consider all issues mentioned in the reviewers' comments carefully: please outline every change made in response to their comments and submit the required files up two months.

Reviewer Assistant Comments:
These comments were generated by AI based on your manuscript. Please review them and consider incorporating the suggestions to enhance your article.
Based on the provided text, the study "Incidence of Dentinal Microcrack using M3 ProGold, Mtwo Rotary File, and Hand File: An In-Vitro Study" appears to be an experimental study evaluating the effects of different root canal preparation methods on dentinal microcracks. To ensure a comprehensive review, the STROBE checklist for cross-sectional studies will be applied, as the study involves the comparison of different groups under controlled conditions.

Review Using the STROBE Cross-Sectional Checklist

1. **Title and Abstract**
- **Title (#1a)**: The title should indicate the study's design. The current title is appropriate as it mentions the comparison of different methods in an in-vitro study.
- **Abstract (#1b)**: The abstract provides a structured summary of the study design, methods, results, and conclusions. This is well-covered.

2. **Introduction**
- **Background/Rationale (#2)**: The background explains the clinical problem of vertical root fractures (VRFs) and the relevance of the study. This is adequately covered.
- **Objectives (#3)**: The objectives are clearly stated, aiming to evaluate surface defects in root canal dentine following preparation with different files.
3. **Methods**
- **Study Design (#4)**: The study design is experimental and involves the comparison of different groups, which is presented early in the paper.
- **Setting (#5)**: The setting is described as an in-vitro study using mandibular premolars.
- **Eligibility Criteria (#6a)**: The eligibility criteria for the samples (100 single-canal mandibular premolars) are clearly stated.
- **Variables (#7)**: The outcomes (surface defects categorized as no defects, fractured, and defective) are clearly defined.
- **Data Sources/Measurement (#8)**: The methods of assessment (sectioning and evaluation under a stereomicroscope) are described in detail.
- **Bias (#9)**: Efforts to address potential sources of bias are not explicitly described. This could be improved by detailing any blinding or randomization procedures used.
- **Study Size (#10)**: The study size (100 samples) is stated, but the rationale for this sample size is not explained.
- **Quantitative Variables (#11)**: The handling of quantitative variables is not explicitly discussed, but the categorization of defects is clear.
- **Statistical Methods (#12a-e)**: The statistical methods (Chi-squared test) are described, but there is no mention of methods to control for confounding, subgroup analyses, handling of missing data, or sensitivity analyses.
4. **Results**
- **Participants (#13a-c)**: The number of samples in each group is reported, but reasons for non-

participation and a flow diagram are not applicable in this context.
- **Descriptive Data (#14a-b)**: Characteristics of the samples are not described, which could be relevant.
- **Outcome Data (#15)**: The results are presented, showing the distribution of defects among the groups.
- **Main Results (#16a-c)**: The main results are reported with statistical significance, but there is no discussion of confounder-adjusted estimates or translation of estimates into absolute risk.
- **Other Analyses (#17)**: No additional analyses are reported.
5. **Discussion**
- **Key Results (#18)**: The key results are summarized, indicating that the M3 ProGold rotary file system creates fewer dentinal microcracks.
- **Limitations (#19)**: Limitations of the study are not discussed, which is a significant omission
- **Interpretation (#20)**: The interpretation is consistent with the results, but a more cautious approach considering limitations and other evidence would be beneficial.
- **Generalizability (#21)**: The generalizability of the results is not discussed.
6. **Other Information**
- **Funding (#22)**: There is no mention of funding sources or the role of funders.

Recommendations for Improvement
- **Bias and Randomization**: Include details on any blinding or randomization procedures to address potential sources of bias.
- **Sample Size Justification**: Provide a rationale for the chosen sample size.
- **Descriptive Data**: Include characteristics of the samples to provide context.
- **Limitations**: Discuss the limitations of the study, including potential biases and the precision of the results.
- **Generalisability**: Address the generalisability of the findings to clinical practice.
- **Funding**: Mention any funding sources and their role in the study.

Response: Thank you for your comment, the manuscript has been revised based on the comments.

By addressing these points, the study can provide a more comprehensive and transparent report, adhering to the STROBE guidelines for cross-sectional studies【4:12†source】.

Best regards

Dr. Niloofar Ebrahimi, DDS

2 Revision 1

4 comments · 17 Jan 2025 – 22 Jan 2025

Referee 2 Reviewer

MAJOR REVISION 17 Jan 2025

The authors have only corrected some of the flaws. I think the analysis requires consultation with a statistician.

Major comments
1. The statistical analysis section is very brief.
2. Were your participants selected using census sampling? Explain.
3. For each statistical decision, you must write the p-values.
4. We did not find any results of the normality tests, and without normality tests, you could not use the ANOVA test.
5. When the results of the ANOVA test are significant, you need a post hoc test.
6. The assumptions of the chi-square test for some variables in table3 are not valid.

Referee 3 Reviewer

ACCEPT 21 Jan 2025

accept

Associate Editor

MAJOR REVISION 21 Jan 2025

Dear EIC,
According to the peer reviewer of this article, specific items still need to be corrected in the article, so the authors should make the desired corrections and submit the revised article again.
Thanks.

Editor-in-Chief

MAJOR REVISION 22 Jan 2025

Dear Authors
Based on the reviewers' and associate editor's comments, your article needs major revision. When revising your manuscript, please consider all issues mentioned in the reviewers' comments carefully: please outline every change made in response to their comments and submit the required files.

3

Revision 2

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

“Peer Review”

Manuscript ID: 151650
Title: Comparative Evaluation of Dentinal Microcrack using M3 ProGold, Mtwo Rotary File and Hand file in Root Canal Therapy: An In-Vitro Study

Dear Dr. Ehsani,

Thank you for the opportunity to submit a revised draft of my manuscript. I appreciate the valuable feedback from you and the reviewers.

I have addressed the reviewers' concerns in the manuscript, with changes highlighted. I have also provided a detailed, point-by-point response to each comment.

Reviewer comments
****
Reviewer 1:

The authors have only corrected some of the flaws. I think the analysis requires consultation with a statistician.

Major comments

1. The statistical analysis section is very brief.

Response: The statistical analysis section has been revised, and more details have been added (Lines 98-112). The revised version of this section is presented below:

“**3.5. Statistical Analysis**

The statistical analysis aimed to compare the incidence of dentinal microcracks across the four experimental groups and assess the interaction between preparation methods and section levels. Descriptive statistics were presented as frequencies and percentages for categorical data. The normality of data was assessed using the Shapiro-Wilk test. The Shapiro-Wilk test is considered more powerful than alternatives like the Kolmogorov-Smirnov test, especially for detecting deviations from normality in smaller datasets (less than 50 samples per group).

The incidence of dentinal microcracks was compared across the groups using the Chi-squared test. For variables where the assumptions of the Chi-squared test were violated (expected frequency < 5), Fisher’s exact test was used.

A two-way ANOVA was performed to evaluate the interaction between preparation methods and section levels. When significant differences were found in the ANOVA, Tukey’s post hoc test was conducted to determine which groups differed significantly.

All statistical decisions were made at a significance level of $\alpha = 0.05$ and a confidence level of 95%. All statistical analyses were performed using SPSS (version 25.0, IBM Corp., Armonk, NY).”

2. Your participants are from census of sampling? Explain.

Response: The samples were selected using the convenience sampling method due to practical limitations in obtaining extracted teeth. This addition has been included in the "sample selection" section of the methods (Lines 37-45):

"**3.2. Sample Selection**

One hundred mandibular premolars, extracted due to orthodontic or periodontal problems from January 2020 to June 2021, were selected for this study. Teeth with a single canal, closed apex, and less than 10º curvature were included to meet the study's inclusion criteria. The samples were chosen using the convenience sampling method due to the practical limitations of obtaining extracted teeth. Teeth with abnormalities, previous root canal treatment, extensive restoration, or existing cracks were excluded to ensure homogeneity. The degree of root canal curvature was evaluated using the Schneider method. While this sampling method was practical, it may limit the generalizability of the findings."

3. For each statistical decision you must write the p-values.

Response: The p-value has been provided for each statistical analysis (see Lines 125-127 and 130-132). The revised version is presented below:

"Table 2 shows the status of the microcracks according to the examined files. There was a significant difference between the 3 preparation instruments regarding crack incidence (Pearson Chi-Square= 75/13, P value=0.003). Mtwo rotary files caused the most significant number of microcracks (8.8%), followed by hand k-files (4.8%). The fewest number of microcracks was seen in M3 Pro Gold (2.4%). [Table 2]

Two-way ANOVA showed significant interactions between preparation methods and section levels (P value = 0.012). Tukey's post hoc test identified Group 3 as having significantly more defects than Groups 2 and 4 ($p < 0.05$)."

4. We did not find any results of the normality tests and without normality tests you could not use the Anova test.

Response: The results of the normality test have been added to the results section (see Lines 115-116).

5. When the results of ANOVA test are significant, you need the post hoc test.

Response: Post-hoc test results have been added to the result section (see Lines 130-132)

6. The assumptions of the chi-square test for some variables in table3 are not valid.

Response: Tables have been revised based on your comment.

Reviewer 2: *accept*

Associate Editor's Comments:
Associate Editor 1:
Dear EIC,
According to the peer reviewer of this article, specific items still need to be corrected in the article, so the authors should make the desired corrections and submit the revised article again.
Thanks.

EIC Decision:
Dear Authors
According to the reviewers and associated editor’s comments, your article needs to be revised majorly. When revising your manuscript, please consider all issues mentioned in the reviewers' comments carefully: please outline every change made in response to their comments and submit the required files up two months.

Response: The manuscript has been revised based on the provided comments.

Best regards

Dr. N. E., DDS

3 Revision 2

3 comments · 1 Feb 2025 – 3 Feb 2025

Referee 2 Reviewer

ACCEPT 1 Feb 2025

The authors have corrected the flaws, and I think the submitted manuscript is suitable for publishing.

Associate Editor

ACCEPT 2 Feb 2025

Dear EIC,
The authors of the article have made the necessary corrections, and the article has been modified based on the reviewer's comments and is now suitable
for acceptance. The article is currently acceptable for publication.
Thanks.

Editor-in-Chief

ACCEPT 3 Feb 2025

Dear Authors
We are pleased to inform you that your article is accepted for publication in the MEJRHS. We hope to receive other suitable articles from your group.