Author’s response to reviews

Title: Acquisition of Basic Ear Surgery Skills: A Randomized Comparison between Endoscopic and Microscopic Techniques

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Version: 1 Date: 29 Aug 2019

Author’s response to reviews:

Dear Doctor Messin

I am pleased to submit a revised version of our manuscript entitled “Acquisition of Basic Ear Surgery Skills: A Randomized Comparison between Endoscopic and Microscopic Techniques” (MEED-D-19-00644) along with the comments to the Reviewers for additional consideration and publication in BMC Medical Education.

We thank the Reviewers for their careful and valuable review of our manuscript. From the feedback, we have addressed the issues raised during peer review. We feel that the review process has significantly improved the quality of our paper.

We remain at your disposal for any additional discussion of our manuscript.

Thank you for your consideration!

Sincerely,

Lukas Anschuetz, MD

Department of Otorhinolaryngology, Head & Neck Surgery
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Comments to the Editor and Reviewers

A. Editor Comments

Please find attached the reviewers comments. There are some minor changes that have been suggested and I would be grateful if these could be addressed.

Thank you for your consideration. We addressed all comments raised by the reviewers as stated below.

B. Li-Ang Lee (Reviewer 1)

Dr. Anschuetz and co-workers performed a quasi-experimental study to assess the difference in acquisition of basic ear surgery skills between endoscopic and microscopic techniques. This study was very interested; the study design and methodology were correct; the statistical analysis was fine; the discussion was excellent; and the conclusion was sound. Comparing to traditional microscopic technique, novel endoscopic technique seems to take less time and cause a lower damages of the ossicular chain in medical students. However, the benefit of endoscopic ear surgery was similar to residents and consultants. The authors recommended that the endoscope should be considered to applied to improve surgical skills in the middle ear in young surgeons without previous training in ear surgery. I have only some minor comments.

1. Please provide a flow chart of this study to let the readers understand the study design more clearly.

Thank you very much for this excellent suggestion. A flow-chart was added.

New Figure 1

Methods section, page 6, lines 113-114

2. Please add the P values of statistical comparisons in Table 1, Figure 3, and Figure 4 for better reading.

Thank you for this comment. The advantage of variance analysis is precisely to have an omnibus test available that checks main and interaction effects for significance. Post-hoc comparisons make sense, however, especially for main effects, interactions can usually be deduced logically from graphics.

Graphs 3 and 4 show the two most important interactions graphically. The mean values are displayed with the corresponding 95% confidence intervals (whiskers). Thus, it can be read directly from the two graphs which mean values differ from each other by paying attention to whether a bar to be compared lies within (not significant) or outside (significant) the whiskers of another bar. In our opinion, the addition of p-values would not improve the readability of the graph and the listing of specific p-values in the graph is also problematic, as we would also have
to explain how the post-hoc tests for the individual group comparisons across within and between subject measures were made and subsequently corrected for multiple comparisons. For these reasons, we do not consider Reviewer 2’s proposal to explicitly display the p-values in the graphs.

3. Please convince the readers that residents performed endoscopic technique better than microscopic technique in terms of time and ossicular damage.

Thank you very much for this suggestion. In effect, the statements regarding the ossicular chain damage are already quite strong in text and also the conclusions. Regarding time, we did not observe any statistically significant interaction in the residents group, therefore we apologize, but we cannot claim a faster execution of the tasks using the endoscopic technique in the residents group. For these reasons we politely refrain from adding additional considerations to the manuscript.

4. Please provide detail comparisons of repeated measurements ANOVAs (perhaps add Table 2). If possible, interactions among variables should be discussed.

Thank you for this comment. We understand that it is proposed to relate the three separate variance analyses to the three dependent variables and to discuss interaction effects. In our opinion, this multivariate approach would only make sense if the three dependent variables were directly comparable. However, this is not the case because these variables represent three different measurements (duration: time, experiments: frequency and damage: frequency) that cannot be compared. One would first have to make the variables comparable before it would make sense to relate them directly to each other. It is trivial and irrelevant for the reported results that there is a certain dependence between the duration and the number of attempts. However, the method part was explicitly extended in the sense that it now becomes clear that three separate variance analyses were made and that this is not a multivariate approach.

Methods section, page 8, lines 169 - 175

5. What is the definition of educational level in the first paragraph of the discussion?

Thank you for this comment. The educational levels area defined in the methods section of the manuscript as following: medical student, resident, consultant. To avoid any confusion to the reader this was added accordingly.

Discussion section, page 11, lines 240-1

6. If every last year medical student will become a young surgeon? If no, please modify the conclusion since this endoscopic training module only provided better training outcomes in terms of completion time, ossicular damage, and learning experience during training basic ear surgical skills in a cadaver course in medical students comparing with microscopic technology.
Thank you for this comment. However, the young surgeons meant here are the residents. To avoid any confusion to the reader this was amended accordingly.

Conclusion section, page 13, line 314

C. Matthaeus Ch. Grasl, MD, MME (Heidelberg) (Reviewer 2):

Dear authors,

this study is very well designed and presented as manuscript draft.

Thank you very much for your sound review of our manuscript. From your comments, we understand, that no modifications to the manuscript are necessary. Accordingly, we refrain from commenting each point listed below, as no questions or suggestions were identified. We hope that we correctly interpreted this review and remain at your disposal in case of misunderstanding.

1. Originality: The intellectual contribution of the authors is explicit visible in all parts. The selected forms and formulation of scientific questions is given by the topics and involves 1. systematic collection, summarization and validation, 2. transfer and adaption, 3. problem definition in practical terms and 4. empirical analysis.

2. Scientific focus: The scientific focus of this study is the acquisition of basic ear surgery skills: a randomized comparison between endoscopic and microscopic techniques.

3. Appropriate study design: The study design is determined by a logical order of the central ideas with novelty value and explanation steps. The entire text is context-related deduced and follows a clear structure. Between the single chapters there are placed logical transitions towards the objectives of the following section. The structure as an integral part demonstrates the authors` conclusive line of thought and serves them and the reader the „read threat“ leading through the paper. The study is characterized by small numbers in each subgroup but allows sufficient statistically statements and presentation of concrete applications with valid methods.

4. Scientific compilation: The science program focuses on topics raising questions not to be answered currently. Particularly with regard to the fulfilment of quality criteria of scientific working methods, transparency - clarification - reproducibility is present with a high scientific impact. The compilation of the relevant scientific literature is contemporary attached to the intended purpose and appropriate thematic priorities. There exists always a complete stock overview, be it basically or specifically. The authors use these systematically gathered input for preexisting factual basis, explanations, comparisons, discussions and juxtapositions.

5. Technical compilation: The compilation of methodology and materials and specific devices with respect to application were explored through an analysis on requirement
with appropriate knowledge and experience in the relevant scientific field. The applied statistical tests are elaborated proportionately and meaningful.

6. Presentation of the results: The entire development of the presented results is disclosed, transparent and verifiable. The text component guides the reader through the key results which answered the investigated questions.

7. Accuracy: The required calibration of the analytical methods with known standards is noticeable.

8. Interpretation of the data. All assumptions, considerations and arguments are explicit derived, justified and discussed. Limitations, strengths and weaknesses of the findings are positioned in critical discussion to the most important literature.

9. Objective support of all claims. The scientific questions are answered satisfactorily explained by the results supporting these answers fitting in with existing knowledge of the themes. Interpretations and opinions explain the implications of the findings, and make suggestions for future research. Conflicting explanations of the results are discussed and calculated. Discussions are dealt concise, brief and specific.

10. Adds to existing knowledge: Outgoing from the represented new scientific knowledge the results of this study are an enlargement of pre-existing knowledge in the field of Medical Education Research