Author’s response to reviews

Title: The morphology of maxillary first and second molars analyzed by cone-beam computed tomography in a Polish population.

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Author’s response to reviews:

Editor-in-Chief

BMC Medical Imaging

Dear Editor,

We would like to submit our revised article entitled: “The morphology of maxillary first and second molars analyzed by cone-beam computed tomography in a Polish population” with a kind request to consider it for publication in BMC Medical Imaging.

Thank you for your interest in our work and for giving us a chance to improve the manuscript. We have added all reviewer comments to the new, revised manuscript.

Response to the comments

1. Reviewer 1

Dear Vania Regina C. Fontanella

Thank you very much for your extremely helpful, creative and in-depth review of our work. We have tried to improve our work by following all the Reviewer's comments and hope that the new version of the manuscript is correct and will be qualified for printing. In order to improve the work, new statistical calculations have been performed and the language of the text has been re-checked by a native speaker, among other things. The changes have been introduced throughout the manuscript: the title, abstract and each part of the main text and tables. We are extending our analysis to include more teeth other than molars, and we hope that this will be included in future work.
Below we present our responses to individual comments.

1. Title

The title is wordy. Please consider a shorter version. My suggestion is: "A cone-beam computed tomography study on upper first and second molars' root canal morphology in a Polish population.

We have changed the title accordingly

Abstract

2. "The majority of maxillary first molars had four root canals (59.5%), while only 40.5% had three root canals." 60% versus 40% is not such difference to use "only".

We have corrected this sentence. The new sentence is as follows: “The majority of maxillary first molars had four root canals (59.5%), while 40.5% had three root canals.”

3. "There are differences in the number and configuration of roots and root canals between maxillary second and first molars in the Polish population." It is a huge generalization from data collected from 112 individuals examined in the same setting.

   - We have corrected this sentence and clarified the contents (thoughts) of this sentence as follows:

Within the limitations of this study, it can be concluded that there are differences in the number and configuration of roots and root canals between maxillary first and second molars in the studied patients of a Polish population. In the second molars, in addition to three-root or four-root canal forms, a few cases of teeth with only one root canal or C-shaped root canals were also found. More attention should be given to the detection of additional canals (MB2) during root canal treatment of maxillary first molars and during root canal treatment of men.

4. "CBCT scanning is an effective method for studying dental morphology." This conclusion does not match the study purpose and is not justified by methods.

This sentence has been removed. As methods of evaluation of tooth anatomy are not compared in this study, this conclusion is not consistent with the purpose of the work. Thank you very much for your comment.
Background

5. Line 36. "The internal morphology of teeth is a labyrinthine challenge for the dentist, who is required to make full use of any acquired knowledge and skills to avoid making mistakes during medical procedures." Did authors mean endodontic procedures?

Yes, the sentence concerns endodontic procedures. We have corrected this sentence. The current sentence is: "The internal morphology of teeth is a labyrinthine challenge for the dentist, who is required to make full use of any acquired knowledge and skills to avoid making mistakes during root canal treatment procedures."

6. Line 53. "Literature reports often emphasize the need to identify an additional root canal (MB2) in the mesiobuccal root; however, its incidence varies (3-5)." In order to justify the study, please make clear what are the plausible causes for this variation.

The explanation (included in the manuscript text) is as follows:

“This variation can be attributed to the different methods that were used by the researchers:

1. study protocols (in vivo or in vitro)
2. sample size,
3. techniques used to identify canal configuration. (6, 7)

This variation could also be associated with age, sex, and ethnic differences of the study populations (8)”

Methods

7. Many questions need clarification. How many CBCT were analyzed to select the final sample? It was consecutive exams? For how long? The inclusion criteria are missing. Patient must have at least one (or two, or all) 1st or 2nd upper molar, for example.

We have improved and completed the description of the test in the "Methods" section as follows:

Cone-beam computed tomography (CBCT) scans of the maxilla of 112 Polish patients, taken as part of the diagnosis or planning of dental treatment in the period May 2015-December 2016 in the Dental Hospital of the Medical University of Lodz, were examined. The included CBCT scans presented first or second molars in patients between 21 and 40 year old.

The inclusion criteria were the following:
a. Each patient had to have at least one (or two, or all) 1st or 2nd upper molars

b. Maxillary molars were free of root canal treatment

c. Molars could not have a post or other reconstructions that would make it difficult to assess their anatomy

d. The teeth had to be completely shaped with fully-developed apices

e. The teeth had not undergone resorption.

Of the 300 CBCT scans examined, 112 fulfilled the selection criteria.

All images were taken using a Gendex GXCB-500 ® machine (Gendex®) with image capture parameters set at 120 kV and 5.0 mA, and an exposure time of 11 s. The voxel size was 0.125 mm. The scans were analyzed using iCATVision software, version 1.9.3.13.

8. The sentence "A total of 112 CBCT images of maxillary first (n=185) and second molars (n=207) from 112 patients…" pertains to the results chapter.

The sentence was moved as suggested

9. "Digitized CBCT images of the maxillary molars were collected…" CBCT is a native digital examination, so the images were not digitized, just selected

The wording was improved as suggested: “CBCT images of the maxillary molars were collected…”

10. Please mention the software used for examination, how many examiners, and if there was a second-round evaluation

All of the images were assessed separately by two operators and any disagreement was discussed until a consensus was reached.

11. Results
Why patients' age and sex were not considered. To my best knowledge, these variables are relevant.

Tables need attention regarding formatting.

As suggested, additional statistical analyses were added concerning the relationship between the occurrence of the MB2 canal and the age and sex of patients. The results and the discussion on this subject have been included in the manuscript.

Tables have been improved.

12. Discussion

Authors pointed out just the CBCT advantages over x-rays. What about radiation doses?

Of course in every situation, the good of the patient should be considered first and care must be taken for his or her safety. According to the principle of "primum no nocere" and "ALARA" ("As Low As Reasonably Achievable") CBCT should be performed only when it is necessary and when it provides information significantly improving the process of diagnosis or treatment of the patient (13). The CBCT scans used in the present study had been intended for diagnostic reasons, not only for performing scientific work.

13. References

The authors have reviewed the additional literature suggested by the Reviewer, and have included these items in the References.

2. Reviewer 2

Dear Kaan Orhan:

Thank you for reviewing our manuscript. The aim of our work was to join the global discussion on dental anatomy evaluated on the basis of CBCT scans. As we have not found any work on dental anatomy in the Polish population so far, this paper represents our attempt to discuss this topic. Our Discussion section includes a number of studies describing the anatomy of the root canal of patients of different ethnic groups, and our discussion highlights similarities and differences in morphology depending, inter alia, on the population status of the examined
patients. The manuscript has been proofread by a certified native speaker, and the relevant certificate (confirming this fact) has been sent to the Editor.

Best regards

Katarzyna Olczak

Halina Pawlicka