Reviewer’s report

Title: Effect of exposure parameters of cone beam computed tomography on metal artifact reduction around the dental implants in various bone densities

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Reviewer: Claire Chalopin

Reviewer's report:

The authors present in this paper the influence of metal dental implants on the amount of artifacts in images of the mandible generated by cone beam computed tomography (CBCT) system. In particular they evaluated the impact of different values of two parameters of the system: the field of view (FOV) and the electrical current (in mA). Moreover, they evaluated the amount of artifacts on different bone densities.

The goal of this paper is to provide advices to obtain images with lower artifacts. The paper does not include any technological innovation but is relevant for clinical practice. Such evaluations were already presented in the past by other clinical teams. However, the novelty of the paper concerns the evaluation approach: the amount of artifacts is quantitatively measured and different bone densities were used. In general, the paper is well written and clear, the experiments were correctly conducted. However, more details and justifications are requested about the choice of the imaging parameters used in the evaluation approach. Moreover, I am not competent to check the statistical methods and results. Therefore, I would recommend the paper for publications after improvement.

Abstract:

* P. 2 l. 33-34: In the paragraph "Results", the word "was" is missing in the last sentence.

Background:

* The medical problem and the aim of the paper are clear.

Methods:

* The authors mention that different parameters of the CBCT system can influence the amount of artifacts. Why do the authors evaluate only the FOV and the electrical current? Why only two different FOV and current values were evaluated? The authors partly answered in the
conclusion. However, could you comment these points in more details and provide an explanation for the choice of your approach, also in comparison with similar evaluation studies in the literature, already at the beginning of the paper?

* Also, only one model of dental implant was evaluated. Please, mention the reason for that.

* P. 6 l. 45-53: Since the value of the electrical voltage remains constant for each experiment, it is enough to mention the value used only once.

* P. 7: The measurements for the bone density and the amount of artifacts are not clearly explained. Which measure is used? Only the mean intensity in ROI? The evaluation performed by the radiologists is little explained. Please, mention that the task is the manual delineation of similar ROI at same positions in the bone before and after implant placement.

Results:

* Tables 1 and 2: the minimum and maximum intensity values are not commented in the text. If this information is not used by the authors in the evaluation, please remove it from the tables. If the information is important to deeper understand the amount of artifacts, please mention it in the text.

* Table 2: Although each set includes 9 mandible sample of a same bone density, the total number of samples reported in the table is 27, right? Please correct n=27 instead of n=9 in the table caption.

* Unfortunately I am not competent to estimate the relevance of the statistical approach and to evaluate the results, especially those reported in Table 3. However, the performance of statistics on a limited number of samples is always questionable.

* The resolution of figures 2 and 3 is not enough to read the values of the intensities. Please improve it.

* Fig. 3: although the images a and b were obtained with the same FOV they are represented with different scaling. It would me more relevant to present them with the same scaling to prevent any confusion for the reader.

* Why the results obtained with a bone density of type 4 are only depicted with 4 mA value (Fig. 6). Would it be not relevant to show the results obtained with 10 mA?
Discussion:

* What is the impact of the processing of the image (p. 7 l. 24-31) on the measurement of the amount of artifacts? Please, comment this point.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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Please indicate the quality of language in the manuscript:

Acceptable

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