

LETTER TO THE EDITOR

Are different imaging methods affecting the treatment decision of extractions of mandibular third molars? Methodological and statistical issues

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We recently read with interest the manuscript published by Manor et al¹ entitled “Are different imaging methods affecting the treatment decision of extractions of mandibular third molars?” published in *Dentomaxillofacial Radiology* 46 (1), 20160233. Manor et al¹ evaluated the differences between treatment decisions of lower impacted third molars among of oral and maxillofacial surgeons (OMS) according to panoramic radiograph and cone beam CT (CBCT) findings. Despite being a subject of important clinical relevance, the authors’ study¹ presented a confusing proposal, results partially demonstrated and conclusions not in agreement to the aim. Therefore, we believe that the authors should clarify some aspects for better understanding of the manuscript.

The Methods and Materials section was presented with an extensive lack of important information concerning study design. We believe that such missing information could have affect the reproducibility of the study and the consistency of results, not supporting the conclusions. As described, panoramic radiographs and CBCT of 62 patients were included;¹ however the authors did not describe the number of lower third molars included. This information is relevant once their occurrence can be unilateral or bilateral, and the teeth do not necessarily assume symmetrical positions. Therefore, different treatment plans can be proposed for a same patient. The mean age of the patients was not informed and, depending on the formation stage of third molars, the choice of treatment could be directly influenced.

The last two inclusion criteria described by Manor et al should be considered as part of image evaluation,

once it could only be performed after patients and images selection.

Concerning the CBCT evaluations, the authors have described that images were presented to the surgeons continuously on a computer screen, which suggests that images were not evaluated in a dynamic way. A static evaluation of CBCT sections, without full volume access, can lead to a misinterpretation of the correct spatial position of teeth in relation to important anatomical landmarks, such as mandibular canal and teeth development abnormalities (e.g. root dilacerations). Previous studies^{2,3} are more reproducible once they have presented the number of third molars included and have performed a dynamic evaluation of CBCT images.

When the authors¹ described the questions that surgeons should answer when analyzing the images, they did not describe the partial odontectomy, that was in the aim. Besides, the questions were about risk and not about treatment decision as described in the aim.

The study would become more reliable if the authors¹ have compared the decisions of surgical treatment, planned with panoramic radiography and CBCT, with the treatment that was actually performed (gold-standard), once they said they had access to the clinical data.¹

The radiological risk factors for inferior alveolar nerve (IAN) damage proposed by Rood and Shehab⁴ (root darkening, root diversion, root narrowing, root splitting, loss of continuity of the upper border of the IAN canal, canal deflection and narrowing of the canal) were presented in the Results and Discussion section; however no mention to this evaluation was made in the Aim and Methods and Materials section. This leads to a misunderstanding of the study and does not guarantee its reproducibility. Neves et al² have also used Rood and Shehab⁴ classification, and differently of Manor et al¹ it was carefully described as a methodological step.

The CBCT acquisition parameters were not described. As previously reported,⁵ although CBCT

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different sizes of field of view and number of basis images did not influence the evaluation of mandibular third molars and their relationship to the mandibular canal in a CBCT unit, smaller voxel size seemed to affect their assessment. Thus, it is important to know the CBCT unit and acquisition parameters employed. This aspect is of great relevance for OMS, once it could affect the diagnosis of risk of damage to IAN and the therapeutic decisions regarding the surgical removal of the impacted third molars. Previous studies^{3,6} have reported that an intimate relationship between the tooth and mandibular canal may influence the decision to perform coronectomy.

In the Statistical Analysis section, the authors have proposed analysis of variance test; however the observers' answers were dichotomized and a test using cross reference table, *e.g.* McNemar's test would be more suitable.

Table 1 demonstrated the treatment decision of each OMS according to panoramic radiography and CBCT but did not effectively compare the different decisions. The two treatment decisions columns (panoramic radiography and CBCT) showed absolute numbers, that in sum is the number of patients included, which makes the data seem to be exclusive and not comparative of both image methods. Also, the κ values were extremely low showing that the observers were not in concordance. This directly affects the reliability of the results and does not support the conclusion.

Table 2 presented a cross-reference among treatment decisions, considering the number of cases as the total of 62 patients vs nine OMS, totaling 558 cases. However, as κ test have indicated a slight agreement (0.038)¹ the

evaluations of the nine OMS should not be taken into consideration as repetitions cases. Table 2 has still shown that there was another possible answer to the panoramic radiography that the authors¹ did not mention before: "Panoramic CBCT referral",¹ once again leading to a confuse understanding of the study and not guaranteeing its reproducibility.

Table 3 presented the OMS evaluations about risk for IAN injury and multirrooted teeth; however there were no mention in the Methods and Materials section on how that evaluation was performed. Besides, the authors¹ described that there was no consensus between OMS panoramic evaluation of radiological finds that could lead to potential damage to the IAN.¹ If there was no consensus in the panoramic evaluation, and this risk factors of possible damage to IAN are directly related to treatment decisions, the coherence of the results could be questioned.

Based on the information presented above about the study design, the statistical analysis and the results, it could be suggested that the conclusion "decision about surgical treatment of lower third molar can be accepted without CBCT findings"¹ could not be supported.

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