LETTER TO THE EDITOR

Comparison of panoramic radiography and cone beam CT in the assessment of juxta-apical radiolucency—an answer to Letter to Editor

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Dear Editor,

We would like to thank Dr Kousar Ramezani and Dr Maryam Foroozandeh for their interest in our article,¹ entitled “Comparison of panoramic radiography and cone beam CT in the assessment of juxta-apical radiolucency”, which was published in *Dentomaxillofacial Radiology* (ID 20170198). We observed that the main questions and comments of these authors were related to the methodology of our study.

As stated in “Discussion” section, our article had a cross-sectional design, based on image evaluation, in which we did not have access to trans- or post-surgical data of the patients that composed our sample. Nevertheless, we believe that surgical access and exploration of juxta-apical radiolucency (JAR) region would be contraindicated in most cases, since the JAR is often in close contact with the mandibular canal and/or causes cortical bone thinning, and additional surgical procedures could increase the risk of injury to the inferior alveolar nerve and cortical damage. In addition, postoperative data also would not indicate with reliability the presence or absence of JAR, since its presence is not always associated with the occurrence of neurosensorial disorders. It is also important to highlight that all previous studies found in the literature on JAR subject do not present any pre- or postsurgical standard method to prove the correctness of its diagnosis,²⁻⁴ being considered present when it is visualized in image exams, which was also adopted in our study.

Therefore, we aimed to compare the detection of this radiographic signal on panoramic radiography (PAN) and cone beam CT (CBCT), which are the two most

commonly used imaging exams for the preoperative assessment of third molars. Considering the degrees of errors that may possibly exist due to both the inherent factors of image formation and the subjectivity of the evaluations, any of these imaging modalities has been considered as a gold standard or reference standard for JAR detection. As the image formation factor (PAN vs CBCT) was the object of our study, we believe that the subjectivity factor was minimized by the calibration of the examiners, who had at least 5 years of experience in imaging diagnosis and have discussed the cases of discordance regarding the JAR presence until reaching a consensus. In addition, the two imaging modalities were evaluated by the same examiners. Thus, we assume that the results reflect the actual difference in JAR detection between PAN and CBCT.

Regarding the suggestion of using simulated defects embedded in three-dimensional printed models to evaluate the accuracy of PAN and CBCT in the detection of JAR, we believe that future studies could consider this idea, since it would be a way of obtaining a gold standard. However, we also point out that there are limitations regarding the number of models that should be spent for this purpose. Moreover, even using modern technologies to manufacture such models, the simulated defects could not faithfully reproduce the clinical parameters of the JAR, which may present in various forms, dimensions and with different spatial relationships in relation to the tooth and the mandibular canal.

As to the statement that the use of a control group would enhance reliability of interpretations made on the effects of JAR on surrounding structures, as performed in the study by Kapila et al,³ we believe that this is not adequate considering our study design. Control groups are used to verify whether a clinical condition causes a particular effect, or whether it occurs at random.^{5,6} Differently, when it is intended to study prevalence, characteristics of a

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condition or its detection in different imaging modalities, as in the present study, the presence of a control group is not feasible, since the researchers must start from an unknown sample and evaluate it, reaching its goal without determining who would be the “study group” or the “control group”. In addition, Kapila *et al*³ compared the thinning caused by JAR with the thinning caused by the third molar/mandibular canal in the control group, disregarding, however, the thinning caused by the tooth and the canal in the JAR group. As reported by Nascimento *et al*,⁵ the relationship of the JAR with the cortices differs from that of the tooth/canal with the cortices, making any comparison difficult. Thus, we do not consider this method suitable for comparison.

Finally, concerning the use of MRI to detect JAR *in vivo*, future studies could be performed to evaluate its performance in this diagnostic task. However, it is

important to emphasize the still restricted use of MRI in dentistry for evaluating dental conditions or, in this case, the preoperative evaluation of third molars. CBCT, as a three-dimensional exam, is considered the reference standard and most widely used today in the evaluation of bone and dental tissues.

Therefore, we are confident that our results are supported by a consistent study design, and we hope to have clarified the questions related to our study.

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