Consideration of positioning errors in the assessment of distortion in the mandibular third molar region on panoramic radiographs

To the Editor:

In reference to the article by Dudhia et al.,1 we would like to thank the authors for an informative study. They took great efforts to make angular measurements and assess the distortion on panoramic radiographs and compare them with corrected sagittal computerized tomography (CT) images. There are numerous studies done to estimate the eruption pattern of mandibular third molars, but very few have assessed the distortion in that region. This article was enlightening owing to the fact that the overall magnitude of the difference between the angular measurements was 4-5°.

However, we would like to highlight certain ambiguities in this article.

First in the methodology, the panoramic radiographs were obtained from different centers. Therefore, these radiographs were not standardized. Also, the need to digitize the CT scan images was not clear.

Second, any error in the head positioning could lead to the apparent tilting of the third molars leading to separation of buccal and lingual cusp tips.2 So use of this criterion to record the tilt of third molars is questionable. The authors have made a very laudable recommendation to use CT scan and, in the future, cone-beam volume tomography for the estimation of difficult third molar impactions, highlighting the accuracy of these imaging modalities. But they also clarify that panoramic radiography still remains the first choice in the assessment of impacted third molars, in spite of its limitations.

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REFERENCES

In reply:

We would like to thank the readers for their comments in relation to our article. They raise a number of valid points, and our response to those comments is below.

The panoramic radiographs used in this study were not usually obtained at the time of CT scanning, and repeat panoramic radiographs were not obtained in accordance with the ALARA principle. Although this has potential to introduce error due to the use of panoramic radiographs obtained by different operators with different levels of experience, it was necessary to obtain an adequate sample size. Also, this scenario more closely resembles the situation in most dental practices and is very typical of large medical radiology practices, highlighting some of the shortcomings of making routine angular measurements from panoramic radiographs of variable quality. Although not discussed in the article, the original research data contained information pertaining to patient positioning errors noted on the panoramic radiographs, and attempts were made to correlate these positioning errors with the resultant difference in observed angulation between panoramic radiographs and CT scans. Unfortunately, no simple correlations were observed, and so these findings were not discussed.

Although it is true that apparent tilting of the third molar on the panoramic radiographs would be influenced slightly by head position, no definite correlation was identified on statistical analysis of the data. Our results indicated that there is a reasonably good correlation between apparent tilting as observed on panoramic radiographs and buccolingual inclination of the lower third molar. As stated in the Materials and Methods, panoramic radiographs with positioning errors were excluded from the study.

All images for the study were digitized in the same manner by the same operator on the same scanner. This was done to enable a consistent measurement technique to be used on both panoramic radiographs and CT scans. It is not necessary to digitize images to make measurements. With today’s full digital workflows, the acquired digital images could be viewed and measured on a workstation without the need to digitize the images.

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