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READER'S FORUM

Jung PK, Lee GC, Moon CH

Comparison of cone-beam computed tomography cephalometric measurements using a midsagittal projection and conventional two-dimensional cephalometric measurements.

- Korean J Orthod 2015;45:282-8

I appreciate the authors for their scholarly work in this paper. It is an interesting topic. I have some questions as follows.

Q1. Could you explain the methods and algorithm in this study for correcting magnification of lateral cephalometric radiography (LCR) in detail?

Q2. As I think, if the sample size was large, smaller differences could be showed between the two-dimensional (2D) and three-dimensional (3D) analysis with higher reliability. However, you pointed out the large sample size of this study as one of the reason for showing significant differences of some measurements contrary to previous studies. Would you be so kind as to explain that?

Q3. As the result, there were statistically significant differences in the 7 angular and 5 linear measurements between the 2D and 3D analysis. However, you also described no clinically significant difference between them in the discussion and conclusion sections. Would you be so kind as to explain the reasons to lead to this conclusion?

Q4. Many studies, including this study, have focused on applying the 2D standards to the 3D analysis. I am wondering about your opinions regarding using the 3D standards for the 3D analysis (necessity, pros and cons, effectiveness, and so on).

Questioned by
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We wish to express our appreciation for the concerns about our published article, which we hope at the same time, will bring a greater attention to this cone-beam computed tomography issue.

A1. As Kumar et al.[1] suggested, it was possible to apply a constant 10% magnification correction regardless of any specifics of the region of a given radiographic image. However, in this study we chose to utilize a caliper in front of the patient's forehead at the time of exposure in LCR, after which the software calculated unique magnification rate that would fit each patient for individualized calibration. We believe that the final magnification-corrected measurements produced the actual measurements though it is likely that perfect matches between the two could be lost in some parts due to variations in the distance between the caliper and the region of interest on the radiographic image. Gribel et al.[2] proposed the use of trigonometric method to capture the differences in the magnification rate from the various regions within the single radiographic image. Yet, we opted not to use the trigonometric method due to the difficulty of its application in clinical situations.

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A2. The parametric tests used in this study conclude that "there is a statistically significant difference", and the statistical tests (*F*-statistics, *t*-statistics) derived from the sample are larger than the critical region. Those statistics contain a within-group standard deviation term in their denominators, and therefore, other things being equal, the larger the sample size, the more likely the statistical tests will reject the null hypothesis.[3] Nonetheless, we regard the sample size difference as one of the possible diverse causes that can explain the different results of this study. We consent that the sample size difference may not be the unique and definitive cause of the results.

A3. In the previous 2D analysis studies, Tng et al.[4] found that 1.0–2.5 mm in linear and 0.9°–1.8° in angular measurement differences existed between cephalometric versus real skull measurements. Subsequently, other 3D investigations also concluded that no clinically significant differences would result from the discrepancies of up to 2 mm in linear and 1° in angular measurements. Therefore, we followed that 1 mm or 1° differences would make no significant clinical differences.

A4. We agree that it would be a good idea to use the 3D standards when using the 3D analysis. But, the difficulty lies in that the literature largely lacks in the articles regarding the 3D standards and that, maybe for the very reason, the 2D analysis is still dominantly used. We believe that using the 2D standards is a valid and practical alternative given the absence of consensus in 3D standard norms. We expect that the 3D analysis could replace the 2D when we know more about them and if the 3D analysis is more widely used in routine clinical settings.

Replied by
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