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Letter to the Editor

Dear Editor,

After reading the article, "Correlation between Protrusive Interocclusal Record and Panoramic Radiographic Image: A Pilot Study," in the April issue of the *Journal of Prosthodontics*, we have concerns with the methodology used in the measurement of the condylar guidance angle. In the article, the authors used panoramic radiography to determine the values of condylar guidance angle.

Research on using radiography to analyze the inclination of condylar guidance traces back to the work of Gilboa et al[1] in 2008. They used a metal wire to trace the outline of articular eminence and the zygomatic arch in the temporomandibular joint (TMJ) area on the skull. They believed that the outline of curvature on the radiograph represented with the metal wire could be used to measure the inclination of condylar guidance angle.

But in Tannamala et al's research,[2] we feel there may be a few problems. First, the author used a method similar to Gilboa et al,[1] by depicting a line between "the most superior and the most inferior points of the curvatures."[2] But where were the curvatures? And what did the curvatures stand for? From the context, it seems that the "curvatures" referred to "the two radioopaque lines [which] are consistently apparent," representing "the outline of the articular eminence and fossa, and the inferior border of the zygomatic arch." Tannamala et al did not make it clear.

In Gilboa et al's work,[1] these curvatures were obvious, for the metal wire was completely radiopaque, but in Tannamala et al,[2] the authors said, "Two radiopaque lines are consistently apparent on the panoramic radiographs in the region of the temporal bone. One depicts the outline of the articular eminence and fossa, the second, the inferior border of the zygomatic arch." But even on the picture the authors chose to show in the article, the outline of these structures is not apparent, but obscured. We feel it is difficult to recognize the two structures described by the curvatures as the authors indicated. Because of the relatively complex anatomical structure around the TMJ area, overlapping in this area can always happen, even by the use of cephalostat. Around the TMJ area, the mandibular notch, coronoid process, zygomatic arch, styloid process, and sinuses can overlap in a panoramic radiographic image, and without an auxiliary method (e.g., metal wire in Gilboa's work), we doubt whether the outline of these structures could be identified clearly, so the curvature the author depicted may not be so precise.

Though Tannamala et al's study[2] concluded that the two measurements did not have a significant difference by *t*-test, the sample size was small. Therefore, we attempted to find the study's test power. The formula we chose for the paired sample was:

$$Z_\beta = \frac{\delta\sqrt{n}}{\sigma_d} - Z_{\alpha/2}$$

According to the data from the article, the result of the Z_β of the difference of condylar guidance angles (in degrees) between that measured from the protrusive interocclusal record (PIOR) and measured from panoramic radiographic image on the right side is 0.087, so the power of the test is 0.54. On the left side, the Z_β value is 0.130, so the power of the test is 0.55. We know the test power should be higher than 80% in most conditions, and the result is less reliable if the value is below 75%.

We have also tried to find the linear correlation between the two groups. Measuring one person's condylar guidance by two methods, the two results should at least have a weak linear correlation. The linear correlation coefficient we calculate on the right side is ($r = 0.172$), meaning there is little correlation, and $t_r = 0.494$ ($p > 0.5$). On the left side, $r = 0.566$, meaning moderate correlation, $t_r = 1.942$ ($0.05 < p < 0.1$). The value of t_r shows it is not correct to deny H_0: "there is no correlation between the two methods" on both sides.

What's more, because the condylar guidance is not only determined by the anatomical inclination of condylar process or the inclination of the mandibular fossa, but also by ligaments around the articular capsule and muscles around the joint. So, we thought using a radiographic method could only estimate the inclination of the condlyar process or the mandibular fossa, as in Wu et al.[3] Though there is strong correlation between the condylar guidance and the inclination of the mandibular fossa and condylar process, the two things are different.

Therefore, we believe that we should think twice before using this method to determine the inclination of condylar guidance.

Respectfully,

Wen Cai, Feng Hao, Ge Mengke, & Liang Xing
State Key Laboratory of Oral Diseases,
West China School of Stomatology, Sichuan University,
Chengdu, China
xingliangdent@vip.163.com

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