## To: Editor, The Angle Orthodontist

## Response to: Accuracy of panoramic radiography in diagnosing maxillary sinus-root relationship: A systematic review and meta-analysis. Wentian Sun, Kai Xia, Li Tang, Chenlu Liu, Ling Zou, Jun Liu. *The Angle Orthodontist*. 2018;88:819–829.

Thank you very much for your interest in our article. We appreciate your insightful question and valuable suggestions.

In the study, to evaluate the robustness of the synthesized results, we investigated potential sources of heterogeneity through meta-regression analysis. Among the six factors investigated, only tooth type was statistically significant in affecting the diagnostic efficacy for type I sinus-root relationship (SRR) (P = .0081). To explain the statistical significance of the tooth type, the anatomical explanation as you mentioned, that the incidence of roots protruding into the maxillary sinus varied among different tooth types should be the best answer.<sup>1–6</sup> The reason we did not discuss the tooth type matter further is that, together with the results of the sensitivity analysis and publication bias test, the robustness of the study was considerable.

This study was a diagnostic systematic review.<sup>7</sup> Panoramic radiography and cone-beam computed tomography (CBCT)/computed tomography (CT) (the gold standard) were used to examine the same anatomical structures (the same teeth and the same maxillary sinuses), and the consistency of the two tests accounted for the accuracy of panoramic radiography. As we have disclosed in the "Results" section, especially the sections titled "Classification Change Between Index and Reference Test" and "Distance From Root Tips to the MSF," there were obviously different diagnostic results between panoramic radiography and CBCT/CT, particularly for SRR type II, III, and IV. Since the same structures were examined, the difference in diagnostic accuracy must be explained by the characteristics of the two radiologic methods themselves, that is, superimposition, magnification, and so on.8,9 The diagnostic accuracy of panoramic radiography for different tooth types was not investigated in the present review, and we would like to see future studies addressing this interesting topic.

## Wentian Sun, Jun Liu

State Key Laboratory of Oral Diseases, National Clinical Research Center for Oral Diseases, Department of Orthodontics, West China Hospital of Stomatology, Sichuan University, Chengdu, China. (e-mail: junliu@scu.edu.cn)

## REFERENCES

- Jang JK, Kwak SW, Ha JH, Kim HC. Anatomical relationship of maxillary posterior teeth with the sinus floor and buccal cortex. *J Oral Rehabil.* 2017;44:617–625.
- Tian XM, Qian L, Xin XZ, Wei B, Gong Y. An analysis of the proximity of maxillary posterior teeth to the maxillary sinus using cone-beam computed tomography. *J Endod*. 2016;42: 371–377.
- 3. Estrela C, Nunes CA, Guedes OA, et al. Study of anatomical relationship between posterior teeth and maxillary sinus floor in a subpopulation of the Brazilian central region using conebeam computed tomography: part 2. *Braz Dent J.* 2016; 27:9–15.
- Kang SH, Kim BS, Kim Y. Proximity of posterior teeth to the maxillary sinus and buccal bone thickness: a biometric assessment using cone-beam computed tomography. J Endod. 2015;41:1839–1846.
- 5. von Arx T, Fodich I, Bornstein MM. Proximity of premolar roots to maxillary sinus: a radiographic survey using conebeam computed tomography. *J Endod.* 2014;40:1541–1548.
- 6. Pagin O, Centurion BS, Rubira-Bullen IR, Alvares Capelozza AL. Maxillary sinus and posterior teeth: accessing close relationship by cone-beam computed tomographic scanning in a Brazilian population. *J Endod.* 2013;39:748–751
- Cronin P, Kelly AM, Altaee D, Foerster B, Petrou M, Dwamena BA. How to perform a systematic review and meta-analysis of diagnostic imaging studies. *Acad Radiol.* 2018;25:573–593.
- Sharan A, Madjar D. Correlation between maxillary sinus floor topography and related root position of posterior teeth using panoramic and cross-sectional computed tomography imaging. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006; 102:375–381.
- 9. American Dental Association Council on Scientific Affairs. The use of cone-beam computed tomography in dentistry: an advisory statement from the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc.* 2012;143: 899–902.