

## Letters to the editor\*

### The influence of variables on predicting growth patterns of adolescents with varying skeletal patterns

The article "Mandibular condyle bone density in adolescents with varying skeletal patterns evaluated using CBCT: A potential predictive tool" (Kim K-J, Park JH, Bay RC, Lee M-Y, Chang N-Y, Chae J-M. *Am J Orthod Dentofacial Orthop* 2018;154:382-9) addresses some controversial issues in orthodontics that we would like to comment on:

In the discussion, the authors stated that bone density could be used to predict the growth pattern, because skeletal growth is influenced by bone metabolism.<sup>1</sup> However, they also mentioned that bone density of the mandibular condyle is affected by the functional pressure generated by the occlusion and mandibular movements.<sup>2</sup> How do the authors think that they could identify the influence of local factors on the values of bone density of the condyles and how could that compromise the analysis of growth prediction?

The determination of mandibular growth was made by the measurement of the ANB angle, which defines the anteroposterior relationship of the mandible with the maxilla in relation to the cranial base.<sup>3</sup> Because that measurement may be influenced by several factors, such as the anteroposterior and vertical positioning of point N,<sup>4</sup> the mandibular plane angle, and the rotation of the bone base,<sup>5</sup> would it, in the authors' opinion, be the most reliable instrument for such evaluation?

There is no consensus regarding the accuracy of the determination of the gray scales in cone-beam computerized tomography (CBCT). Studies have described that the correction methods of gray values obtained in CBCT still do not generate consistent values that are independent of the devices and their configurations or of the scanned objects.<sup>6</sup> One factor that might be related to the variability of the gray values in CBCT is the position held by the region of interest (specific area of measurement of density) inside the field of view (FOV). This variability occurred when density was determined in various places of a homogeneous structure and with more intensity when the same object was scanned repeatedly in different positions inside the FOV under the same exposure conditions.<sup>7</sup>

\*The viewpoints expressed are solely those of the author(s) and do not reflect those of the editor(s), publisher(s), or Association.

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#### REFERENCES

1. Kim K-J, Park JH, Bay RC, Lee M-Y, Chang N-Y, Chae J-M. Mandibular condyle bone density in adolescents with varying skeletal patterns evaluated using cone-beam computed tomography: a potential predictive tool. *Am J Orthod Dentofacial Orthop* 2018; 154:382-9.
2. Muhlberger G, Svejda M, Lottersberger C, Emshoff R, Putz R, Kuhn V. Mineralization density and apparent density in mandibular condyle bone. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107:573-9.
3. Riedel RA. A cephalometric roentgenographic study of the relation of the maxilla and associated parts to the cranial base in normal and malocclusion of the teeth [thesis]. Chicago: University Northwestern Dental School; 1948.
4. Jacobson A. The "Wits" appraisal of jaw disharmony. *Am J Orthod* 1975;67:125-38.
5. Jacobson A. Application of the "Wits" appraisal. *Am J Orthod* 1976; 20:179-89.
6. Campos MJS, Souza TS, Mota Júnior SL, Fraga MR, Vitral RWF. Bone mineral density in cone beam computed tomography: only a few shades of gray. *World J Radiol* 2014;6:607-12.
7. Nackaerts O, Maes F, Yan H, Couto Souza P, Pauwels R, Jacobs R. Analysis of intensity variability in multislice and cone beam computed tomography. *Clin Oral Implants Res* 2011;22:873-9.

#### Authors' response

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

The mandibular condyle has a different microstructure than the other parts of the mandible, which may have different effects on the type or orientation of the force applied.<sup>1</sup> We could not confirm a correlation between the maximal occlusal force and the mean bite force. Because our study was cross-sectional, we could not confirm the change of condyle bone density over time in 1 subject. Further study might be necessary to answer this question.

ANB angle is the most commonly used skeletal classification in many studies.<sup>2</sup> Studies comparing ANB angle with other measurement methods have shown similar skeletal classification results.<sup>3</sup> Also, in