

READER'S FORUM

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**External apical root resorption 6 months
after initiation of orthodontic treatment:
A randomized clinical trial comparing fixed
appliances and orthodontic aligners.**

- *Korean J Orthod* 2021;51:329-336

As one of the most prevalent complications during orthodontic treatment, external apical root resorption (EARR) is the clinicians' main concern for orthodontic patients. Moreover, the comparison between fixed orthodontic appliances and clear aligners of the effect to the root resorption in the initial treatment phase was barely studied before. So I read this article with particularly great interest. This study compared the magnitude of EARR 6 months after starting orthodontic treatment with fixed appliances and clear aligners, and it showed a small amount of root resorption which was comparable between two groups. I have a few questions to the authors about this study.

Q1. Periapical radiographs were taken to evaluate the EARR. In order to standardize the radiographic images, the parallel technique was used with a specific positioner. Even though the measurement with periapical radiographs is certainly more accurate than that with panoramic radiographs as the authors described several times in this article, I am curious how reliable is the result of periapical measurements. According to Figure 1 of this article, it was measured in 0.01-mm unit. How do you think of the accuracy of the measurements, and is there any

other studies which support your method?

Q2. The authors compared the length of each tooth between T0 and T1 (Table 2), and between clear aligners and fixed orthodontic appliances (Table 3). I would like to ask the authors if they compared the EARR among the tooth types; for example, upper teeth vs. lower teeth or central incisors vs. lateral incisors. In addition, only upper left central incisor showed a significant difference in the change of tooth length between two groups, as shown in Table 3. Is there any particular reason that the authors guess?

Q3. I want to ask the authors respectfully what they think the main implication of this study is. In T1, 0.016" x 0.022" NiTi archwire was applied, which means only leveling and alignment procedure was performed to the subjects treated with fixed appliances, while many other studies measured the magnitude of root resorption after finishing the orthodontic treatment. Except the importance of the first 6 months of active treatment in the subsequent increase in resorption, which clinical message do you want the readers to accept in this article based on the result of the first 6 months of treatment?

Q4. The orthodontic treatment for the subjects started in May 2019. I guess the treatment for almost all the patients have been finished now. I wonder if the authors measured the tooth length again after finishing the orthodontic treatment for the same subjects, and if they have any plan to publish the further study suggesting those results.

Questioned by

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We would like to thank for the questions related to our study, which allow us to deepen the discussion on the topic, in addition to improve some aspects.

A1. Periapical radiography is the most widely used test for detecting EARR, owing to the convenience of compact radiographic devices that can be located in offices, which are also usually more affordable than other forms of imaging diagnostics.¹ In this study, the technique of parallelism was adopted using an acrylic device, which enables the radiographic film to be placed absolutely perpendicular to the x-ray beam. The reliability of this technique has been proven from previous studies, such as that of Gegler and Fontanella,¹ who used teeth inserted in resin blocks and varied their inclinations by up to 20°. Their results showed that this positioning was efficient in maintaining the length of the teeth in the radiographic image using the different simulated slopes. Nassif et al.² also used this methodology to compare the magnitude of EARR of maxillary incisors in patients with mild to moderate anterior crowding, treated with lingual and conventional labial orthodontics and found similar results between the techniques.

A2. We did not compare the EARR among the tooth types, although it could be a very interesting analysis. Regarding the significant difference in relation to EARR found only for upper left central incisor, we believe that it is a random result, because the mean values are very close. Additionally, the overall differences between groups were not clinically relevant, ranging from 0.03 to 0.35 mm.

A3. We understand that full treatment data would provide complete information regarding EARR. However,

many studies²⁻⁵ pointed out the importance of monitoring the first 6 months of treatment, in order to control EARR throughout treatment, since patients with detectable root resorption during the first six months of active treatment are more likely to experience resorption in the following six-month period than those without. Thus, we understand that this preliminary information is of interest of the readers since it may instruct the orthodontist as to individual limits of each patient, according to different devices.²

A4. We have not yet performed the measurements, but we intend to publish the results as soon as we complete this stage of the study.

Replied by

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