

## READER'S FORUM

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**Comparison of tooth movement and biological response in corticotomy and micro-osteoperforation in rabbits.**

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Recently, with the preference for non-invasive procedures, micro-osteoperforation has emerged as an alternative to corticotomy. Since the design of corticotomy has not been established to date, this study comparing the treatment effect of various design of corticotomy and micro-osteoperforation would be valuable for most orthodontists.

**Q1. In this study, the amount of tooth movement was evaluated at 4 weeks after orthodontic force application. The tooth moved 1.72 mm in the control group, and 2.27–2.52 mm in the intervention group. Considering that the tooth movement is typically 1 mm for a month, these amount of tooth movement is somewhat excessive. Evaluation of tooth movement needs to be accompanied by the change of tooth inclination. In particular, I was wondering whether the large amount of tooth movement in the experimental group was due to excessive tipping movement.**

**Q2. The authors defined the intervention site, as the mesial surface of the first premolar roots (pressure side); and the non-intervention site, as the distal surface of the first premolar root (P1–P2, tensional side). The effect of corticotomy is not limited to the area where it is performed. Previous studies**

**have shown that corticotomy performed on one side (pressure side) also affects bone metabolism on the opposite side (tensional side). Is there any reason that P1–P2 was chosen as the non-intervention site? It is thought that a non-intervention site would be set up as a site that is not affected by corticotomy.**

**Q3. When comparing between indentation corticotomy group and micro-osteoperforation group, the number, size and depth of indentation was different between groups. The perforation design should be identical to evaluate whether flap elevation affects tooth movement or not. Why did the authors make a difference in indentation design between the two groups.**

*Questioned by*

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**A1. The typical tooth movement of 1 mm per month is a rough average that can be safely mentioned for human beings, not for rabbits. The bone turnover for rabbits is faster than in human beings as mentioned in our discussion, and also the bone density is much lower hence less forces are usually used for such studies. In a previous study,<sup>1</sup> the rabbit teeth moved 4.82 mm in 20 days by tipping movement. Therefore, if our tooth movement were excessive tipping it should have shown much more than 1.72 mm in 4 weeks. Moreover, the aim of this study was to compare between the groups and since the mechanics applied on both groups were the same, then the difference between groups can be**

attributed to the intervention, regardless of the nature of the tooth movement.

However, the authors had not claimed that the teeth had showed pure bodily movement. It was just the normal combination of tipping and bodily movement similar to the combinations we usually see with patients. Nevertheless, it might be interesting to assess the effect of corticotomy on the amount of tipping, in future studies.

**A2.** Several studies have suggested the extension of the effect of corticotomy.<sup>2</sup> In our study, the result was not confirming or denying these findings since we don't have a negative control group for such comparison.

The non-intervention site in our study was not intended to be an area not affected by the corticotomy because we already had a group for this purpose (the positive control group). The selection of the region between P1–P2 was to compare the effect of the corticotomy on the tension side of tooth and compare it to the effect of the non-surgically assisted tooth movement.

**A3.** The aim was not to evaluate the effect of flap elevation, it was to compare the indentation corticotomy design as described in the method section (which is usually performed by our oral surgeon at the clinic) to the micro-osteoperforation method which is similar to those created by the PROPEL device.

*Replied by*

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#### References

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2. Zou M, Li C, Zheng Z. Remote corticotomy accelerates orthodontic tooth movement in a rat model. *Biomed Res Int* 2019;2019:4934128.

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