

Letters From Our Readers

To: Editor, *The Angle Orthodontist*

Re: Response To: Effect of injectable platelet-rich fibrin (i-PRF) on the rate of tooth movement. Emire Aybuke Erdur, Kotter Karakasli, Elif Oncu, Bahadir Ozturk, Sema Hakkı. *Angle Orthod.* 2021;91:285-292.

Thank you for giving us the chance to respond to Dr. Tripathi and colleagues' comments about our article. These comments enable further clarification regarding some aspects of our research.

There was no clinical study about i-PRF to refer to when designing this study. To reduce treatment time, many techniques have been described in the literature to accelerate tooth movement based on the regional acceleratory phenomenon.¹⁻⁵ The procedures applied in these studies were in the direction of tooth movement. Also, in an animal study about PRP,² the injection was applied to the direction of tooth movement. For this reason, we applied i-PRF only on distal aspect of the canine. The amount of i-PRF was standardized as 4 mL and was injected intraligamentally into the distobuccal and distopalatal side of the canine tooth (2 mL for each side). An in vivo study showed that a new formulation of PRF (A-PRF, i-PRF) had a gradual release of growth factors, up to about a week, and stimulated significantly greater growth factor release over time.⁶ So it should have been longer than a week for the second activation. In our study, the study group received i-PRF two times: just after premolar extraction and at the second week of distalization. The contralateral side served as a control and received only a sham injection. The first PRF application and extraction of the teeth was accomplished at the same time. We mentioned the closure of the space in the discussion section as i-PRF demonstrated a significant increase in the rate of canine tooth movement. The positive effect of i-PRF on the rate of tooth movement started in the first week and was seen throughout the follow-up period.

The study group received i-PRF two times: just after premolar extraction and at the second week of distalization. We mentioned before that i-PRF had a gradual release of growth factors, up to about 1 week, and stimulated significantly higher growth factor release. The aim in our study was to determine whether the effect of i-PRF on tooth movement would continue in the long term. To determine this, we

evaluated tooth movement velocity and the correlation at T3 and T4 time points. The results were presented in Table 1 in the study.⁷

We mentioned in the discussion section that OPG inhibits osteoclast differentiation by binding to RANKL. These cytokines play significant roles in reinforcing and activating osteoclast precursor cells. Increased release of these factors is accompanied by higher osteoclast activation and therefore a higher rate of tooth movement.^{1,3} Periodontal ligament cells can regulate osteoclastogenesis by reverse mechanisms with stimulation of resorptive activity by RANKL and inhibition by OPG. Kanzaki et al.^{8,9} demonstrated that compressive force increased the production of RANKL and decreased that of OPG in human periodontal ligament cells. Baloul et al.³ reported that alveolar decortication stimulated the RANKL/OPG ratio where an increase in RANKL was associated with decreased OPG which was more rapid and simultaneous compared to conventional tooth movement.

There are many studies that have had similar results; a low OPG level may be related to rapid orthodontic tooth movement. There are many factors that affect the difference in study results. Only ten adolescent patients were included in the study you mentioned. GCF was collected at the distal cervical margins of the experimental and control teeth at 0, 1, 24, and 168 hours after the force was applied. The statistical analysis was performed using a non-parametric test (Mann-Whitney U-test). Also, the researchers had attributed this difference in RANKL and OPG to their experimental design, which did not provide for a continuous and consistent force over the entire experimental period of 168 h.

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