

## INTISARI

*Matrix metalloproteinase-9* adalah satu biomarker dalam pergerakan gigi ortodonti. Ekspresi MMP-9 oleh osteoklas berperan dalam degradasi matriks ekstraseluler selama proses resorpsi dan remodeling tulang. Penelitian ini bertujuan untuk menganalisis perbandingan pengaruh injeksi i-PRF dan a-PRF terhadap ekspresi MMP-9 pada sisi tertekan pergerakan gigi ortodonti kelinci.

Empat puluh lima kelinci dibagi secara acak menjadi 3 kelompok (n=15): kontrol, i-PRF, dan a-PRF. Peranti ortodonti *open coil spring* dengan kekuatan gaya 50cN dipasang diantara braket insisivus rahang bawah. Aplikasi i-PRF dan a-PRF dilakukan dengan cara injeksi secara intrasulkular pada sulkus gingiva area kompresi setiap 7 hari. Ekspresi MMP-9 dianalisis secara imunohistokimia pada hari ke-0, 3, 7, 14, dan 21.

Hasil penelitian menunjukkan ekspresi MMP-9 meningkat secara signifikan ( $p < 0,05$ ) pada hari ke-3 dan 7 dan mulai menurun pada hari ke-14 dan 21. Peningkatan ekspresi MMP-9 tertinggi pada kelompok yang mendapat injeksi a-PRF diikuti kelompok i-PRF dan terendah pada kelompok kontrol. Injeksi intrasulkular a-PRF dapat meningkatkan ekspresi MMP-9 lebih tinggi secara signifikan dibanding injeksi intrasulkular i-PRF. Injeksi intrasulkular i-PRF dan a-PRF dapat meningkatkan ekspresi MMP-9 di sisi tertekan dan membantu terbentuknya lingkungan yang mendukung remodeling tulang.

**Kata Kunci:** i-PRF, a-PRF, MMP-9, pergerakan gigi ortodonti

## ABSTRACT

Matrix metalloproteinase-9 is one of the biomarkers involved in orthodontic tooth movement. Expression of MMP-9 by osteoclasts plays important role in extracellular matrix degradation during bone resorption and remodeling. This study aims to analyze the comparative effects of i-PRF and a-PRF injections on MMP-9 expression in compression side during orthodontic tooth movement in rabbits.

Forty-five rabbits were randomly divided into three groups (n=15): control, i-PRF, and a-PRF. Orthodontic force of 50cN was applied to the lower incisors using open coil spring between lower incisor bracket. The i-PRF and a-PRF were gently injected into the distal gingival sulcus every seven days. The MMP-9 expression was examined using immunohistochemistry staining on days 0, 3, 7, 14, and 21.

The results of the study showed that MMP-9 expression increased significantly ( $p<0.05$ ) on day 3 and 7 and began to decrease on day 14 and 21 following activation of the orthodontic appliance. The highest increase in MMP-9 expression was observed in the group that received a-PRF injections, followed by the i-PRF group, with the lowest expression in the control group. Intrasulcular a-PRF injection significantly increased MMP-9 expression compared to intrasulcular i-PRF injection. Both i-PRF and a-PRF intrasulcular injections can increase MMP-9 expression in compression side thus help create an environment that supports bone remodeling.

**Keywords:** i-PRF, a-PRF, MMP-9, orthodontic tooth movement