

INTISARI

Fase pasca stabilisasi ortodonti merupakan fase yang sangat penting karena gigi geligi memiliki kecenderungan untuk kembali ke posisi semula atau relaps. Remodeling tulang berperan penting dalam pencegahan relaps pada fase pasca stabilisasi. Proses remodeling dikaitkan dengan interaksi antara *Reseptor Activator of Nuclear Factor K β -Ligand* (RANKL), *Reseptor Activator of Nuclear Factor K β* (RANK), dan osteoprotegerin (OPG). Osteoprotegerin menghambat ikatan RANK terhadap RANKL sehingga menurunkan proses resorpsi tulang. *Blue-LED* memberikan efek fotobiomodulasi sehingga meningkatkan dan mempercepat produksi ATP. Penelitian ini bertujuan untuk mengetahui pengaruh waktu pengamatan dan pemaparan *blue-LED* panjang gelombang 490 nm intensitas 1000 mW/cm² terhadap kadar OPG cairan sulkus gingiva sisi tertekan pada fase pasca stabilisasi ortodonti.

Sepuluh tikus Wistar dibagi menjadi 2 kelompok (n = 10), kelompok kontrol dan kelompok *blue-LED*. Dua gigi incisivus rahang bawah tikus Wistar digerakkan ke distal menggunakan *open coil spring*. Pemaparan *blue-LED* 30 detik dilakukan selama 7 hari pada fase stabilisasi. Sampel cairan sulkus gingiva diambil pada hari ke-0, 3, 7, dan 14 pada fase pasca stabilisasi. Kadar OPG dianalisis menggunakan uji ELISA. Data yang diperoleh dianalisis menggunakan uji Anava satu jalur dan uji *Post Hoc* LSD.

Hasil penelitian menunjukkan kadar OPG pada kelompok *blue-LED* lebih tinggi dibandingkan kelompok kontrol. Kadar OPG pada kelompok *blue-LED* mengalami peningkatan dari hari ke-0, 3, 7, dan 14 dengan puncak tertinggi hari ke-14. Kesimpulan penelitian ini adalah pemaparan *blue-LED* panjang gelombang 490 nm intensitas 1000 mW/cm² dapat meningkatkan kadar OPG cairan sulkus gingiva sisi tertekan pada fase pasca stabilisasi ortodonti gigi tikus Wistar.

Kata Kunci : Fase pasca stabilisasi, *blue-LED*, osteoprotegerin, tikus Wistar

ABSTRACT

The post orthodontic stabilization phase is a very important phase because the teeth have a tendency to return to their original position or relapse. Bone remodeling has an important role in preventing relapse in the post-stabilization phase. The remodeling process is associated with the interaction between the Receptor Activator of Nuclear Factor κ B-Ligand (RANKL), the Receptor Activator of Nuclear Factor κ B (RANK), and osteoprotegerin (OPG). Osteoprotegerin inhibits RANKL bonds to RANK thereby decreases the bone resorption process. Blue-LED provides a photobiomodulation effect thereby increasing ATP production. This study aimed to determine the effect of blue-LED irradiation with wavelength of 490 nm and intensity 1000 mW/cm² on the OPG level in gingival crevicular fluid on the pressure sides in the post-orthodontic stabilization phase.

Ten Wistar rats were divided into 2 groups (n = 10), control groups and blue-led groups. The orthodontic force of 35 grams was applied to the inter-incisor of the mandible using an open coil spring. Blue-LED was exposed for 30 seconds in the stabilization phase during 7 days. The gingival crevicular fluid were obtained on days 0, 3, 7, and 14 in the post-stabilization phase. OPG levels are analyzed using the ELISA test. The data obtained were analyzed using ANOVA and Post Hoc LSD test.

The results showed that the OPG levels in the blue-LED group were higher than the control group. OPG levels in the blue-LED group have increased from days 0, 3, 7, and 14 with the highest peak of the 14th day. The conclusion of this study is blue-LED irradiation with wavelength of 490 nm and intensity of 1000 mW/cm² can increase the level of OPG in the gingival crevicular fluid on the pressure sides in the post-orthodontic phase of the Wistar rats.

Keywords: The post-stabilization phase, blue-LED, osteoprotegerin, Wistar rats