

## INTISARI

Pemaparan *blue light-emitting diode* (*blue-LED*) saat periode stabilisasi dapat mencegah relaps dengan meningkatkan osteoblas sisi tertarik, yang ditandai dengan peningkatan kadar alkaline fosfatase (ALP) dalam cairan sulkus gingiva (CSG). Tujuan penelitian ini menganalisis pengaruh pemaparan *blue-LED* saat periode stabilisasi terhadap kadar ALP dalam CSG sisi tertarik gigi tikus Wistar (*Rattus norvegicus*) pada waktu pengamatan hari ke-0, 3, 7, dan 14 pasca stabilisasi.

Sepuluh ekor tikus Wistar jantan umur 2,5-3 bulan, berat 200-250 gram dibagi dua kelompok (kelompok kontrol dan kelompok LED). Gaya ortodonti 35 gram diberikan pada inter insisivus rahang bawah menggunakan *open coil spring*. Pemaparan *blue-LED* 30 detik panjang gelombang 490 nm dan intensitas 1000 mW/cm<sup>2</sup> satu kali sehari selama 7 hari stabilisasi. Pengambilan CSG dengan *paper point* hari ke-0, 3, 7, dan 14 pasca stabilisasi untuk pengukuran kadar ALP menggunakan metode *enzyme-linked immunosorbent assay* (ELISA). Dilakukan uji statistik Anava dua jalur dan *Post Hoc* LSD.

Hasil penelitian menunjukkan kadar ALP kelompok LED lebih tinggi daripada kelompok kontrol. Terjadi peningkatan kadar ALP pada hari ke-7 dan 14 pada kelompok kontrol dan LED. Disimpulkan bahwa pemaparan *blue-LED* meningkatkan kadar ALP dalam CSG sisi tertarik. Peningkatan kadar ALP terjadi mulai hari ke-7 dengan puncak kadar tertinggi pada hari ke-14. Terdapat interaksi antara pemaparan *blue-LED* dengan waktu pengamatan terhadap kadar ALP dalam CSG sisi tertarik.

Kata kunci: *blue-LED*, relaps ortodonti, alkaline fosfatase (ALP).

## ABSTRACT

Blue light-emitting diode (blue-LEDs) exposure during the stabilization period can prevent relapse by increasing the tension side osteoblasts, which is characterized by increased levels of alkaline phosphatase (ALP) in the gingival crevicular fluid (GCF). The purpose of this research was to analyze the effect of blue-LEDs exposure during the stabilization period on ALP levels in the GCF on the tension side at the time of observation on days 0, 3, 7, and 14 post-stabilization.

Ten male Wistar rats (*Rattus norvegicus*) aged 2,5-3 months, weighing 200-250 grams were divided into two groups (control and LED group). An orthodontic force of 35 grams open coil spring was applied to the mandibular inter incisors. Blue-LEDs exposure (490 nm, 1000 mW/cm<sup>2</sup>) for 30 seconds once a day for 7 days of stabilization. The GCF on the tension side was taken with paper points on days 0, 3, 7, and 14 post-stabilization for the ALP measurement using an *enzyme-linked immunosorbent assay* (ELISA) method. Two-way ANOVA and Post Hoc LSD statistical tests were performed.

The results showed that the ALP levels in the LED group were higher than in the control group. Increasing ALP levels occurred on days 7 and 14 in the control and LED groups. It was concluded that blue-LEDs exposure increased ALP levels. Increasing ALP levels occurred from day 7 with the highest peak level on day 14. There is an interaction between blue-LEDs exposure and observation time on ALP levels.

**Keywords:** blue-LEDs, orthodontic relapse, alkaline phosphatase (ALP).