

INTISARI

Pemaparan *blue light-emitting diode (blue-LED)* pada periode stabilisasi dapat menghambat terjadinya relaps dengan meningkatkan osteoblas sisi tertarik, yang ditandai dengan peningkatan kadar *Transforming Growth Factor-Beta 1 (TGF- β 1)* dalam cairan sulkus gingiva (CSG). Penelitian ini bertujuan menganalisis pengaruh pemaparan *blue-LED* saat periode stabilisasi terhadap kadar TGF- β 1 dalam CSG sisi tertarik gigi tikus Wistar (*Rattus norvegicus*) pada waktu pengamatan hari ke-0, 3, 7, dan 14 pasca stabilisasi.

Hewan uji berupa sepuluh ekor tikus Wistar jantan berusia 2,5-3 bulan dengan berat 200-250 gram dibagi menjadi dua kelompok (kelompok kontrol dan kelompok pemaparan LED). Gaya ortodonti sebesar 35 gram diberikan antara insisivus rahang bawah menggunakan *open coil spring*. Pemaparan *blue-LED* dengan panjang gelombang 490 nm dan intensitas 1000 mW/cm² selama 30 detik per hari selama 7 hari stabilisasi dilakukan pada kelompok perlakuan. Pengambilan CSG dengan *paper point* pada hari ke-0, 3, 7, dan 14 pasca stabilisasi untuk pengukuran kadar TGF- β 1 menggunakan spektrofotometer (450 nm). Dilakukan uji statistik Anava dua jalur dan *Post Hoc LSD*.

Hasil menunjukkan kadar TGF- β 1 kelompok LED lebih tinggi daripada kelompok kontrol. Terjadi peningkatan kadar TGF- β 1 secara signifikan pada hari ke-7 dan memuncak di hari ke-14 pada dua kelompok, namun tampak lebih tinggi pada kelompok perlakuan. Waktu pengamatan hari ke-0, 3, 7, dan 14 meningkatkan kadar TGF- β 1 dalam CSG sisi tertarik pada pemaparan *blue-LED*, peningkatan kadar TGF- β 1 sejak hari ke-7 dengan kadar tertinggi pada hari ke-14. Terdapat interaksi pemaparan *blue-LED* dengan waktu pengamatan terhadap kadar TGF- β 1 dalam CSG sisi tertarik. Kesimpulan penelitian ini adalah pemaparan *Blue-LED* pasca stabilisasi dapat meningkatkan hasil stabilisasi pasca perawatan ortodonti.

Kata kunci: waktu pengamatan, *blue light emitting diode (blue-LED)*, *Transforming Growth Factor-Beta 1 (TGF- β 1)*, sisi tertarik, stabilisasi pasca ortodonti.

ABSTRACT

The exposure of the blue light-emitting diode (blue-LED) during the stabilization period may prevent orthodontic relapse by increasing the activity of osteoblasts in the tension side, as indicated by also an increase in the Transforming Growth Factor-Beta 1 (TGF- β 1) levels in the gingival crevicular fluid (GCF). This study aims to analyze the effect of blue-LED exposure during the stabilization period on TGF- β 1 levels in the GCF of the tension side of Wistar rats (*Rattus norvegicus*) on observation days 0, 3, 7, and 14 post-stabilizations.

The test subjects were ten male Wistar rats aged 2.5-3 months, weighing 200-250 grams, that divided into two groups (control group and LED group). Orthodontic force of 35 grams was applied between the lower incisors using an open coil spring. Blue-LED exposure with a wavelength of 490 nm and an intensity of 1000 mW/cm² was given for 30 seconds per day for a total of 7 days during stabilization. GCF samples were collected using paper points on days 0, 3, 7, and 14 after stabilization specifically on the tension side. Samples then sent to the lab for TGF- β 1 level measurement using a spectrophotometer (450 nm). Two-way ANOVA and Post Hoc LSD statistical tests were performed.

The results showed that the TGF- β 1 levels in the LED group were significantly higher than in the control group on the 7th and 14th days. It was concluded that blue-LED exposure increases TGF- β 1 levels in the tension side. The observation on days 0, 3, 7, and 14 increased TGF- β 1 levels in the tension side with blue-LED exposure, starting from 7th day and the highest level on the 14th day. Interaction between blue-LED exposure and observation time on TGF- β 1 levels in the tension side was evident. This research concludes that blue-LED exposure in post stabilization may enhance post orthodontic treatment.

Keywords: observation time, blue light emitting diode (blue-LED), *Transforming Growth Factor-Beta 1* (TGF- β 1), tension side, post-orthodontic stability.