THERAPEUTIC EFFECTS OF LOW-LEVEL LASERS AND LIGHT-EMITTING-DIODES ON INFLAMMATION AND EPITHELIAL OXIDATIVE STRESS PARAMETERS IN AN EXPERIMENTAL BURN MODEL

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Background: The aim of the study was to investigate the biochemical and molecular changes in the process of epidermal healing of burn injuries after therapeutic treatment with LLL and LED. Methods: Rats were divided into 6 groups (n = 6): control group, lesion group (LG; animals with epithelial burn lesions without local or systemic treatment), LG + 670-nm laser, LG + 904-nm laser, LG + 632-nm LED, and LG + 850-nm LED. The burn wound model was performed using a 100°C copper plate, with 15 s of contact time with the skin. LLL irradiation was carried out in five distinct regions around the wound, whereas LED irradiation was performed over the entire injured area. The irradiations began 24 hours after the lesion models had been established, and were performed daily for 7 days. Two hours after the last laser application, the animals were euthanized and the outer edge of the wound was surgically removed for analysis of oxidative stress parameters and the levels of interleukin-6 and extracellular signal-regulated kinase (ERK) 1/2. The burn wound groups showed significant increases in superoxide production, dichlorofluorescein, and nitrites, and high protein oxidative damage. Additionally, the activities of glutathione peroxidase and catalase were also increased, and a significant reduction in glutathione levels was observed compared to in the control group. However, treatments with 670-nm LLL and 850-nm LED were found to promote protection to oxidative stress, and similar results were also observed in the analysis of interleukin-6 and ERK1/2. Conclusion: Taken together, these results suggest that LLL at 670 nm and LED at 850 nm appear to be effective at reducing the inflammatory response and oxidative stress parameters, thus qualitatively accelerating the repair of burn wounds.

Key words: tissue repair; laser; inflammation; LED and burn.