

Histological Assessment of a Combined Low-Level Laser/Light-Emitting Diode Therapy (685 nm/470 nm) for Sutured Skin Incisions in a Porcine Model: A Short Report

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Abstract

Objective: The aim of our study was to evaluate, from a histological point of view, the effect of photobiomodulation (PBM) with combined low-level laser therapy (LLLT)/light-emitting diode (LED) on porcine skin wound healing.

Background data: Most LLLT/LED wound healing studies have been performed on various types of rat models, with their inherent limitations. Minipigs are evolutionary and physiologically closer to humans than rats.

Materials and methods: With the animals under general anesthesia, one full-thickness skin incision was performed on the back of each minipig (n = 10) and immediately closed using simple interrupted percutaneous sutures. The minipigs were randomly allocated into two groups: a PBM-treated group (LLLT k = 685 nm, LED k = 470 nm, both light sources producing power densities at 0.008 W/cm²; each light source delivering total daily doses of 3.36 J/cm²) and a sham-irradiated control group. Half of the animals in each group were killed on postoperative day 3, and the other half were killed on the postoperative day 7, and samples were removed for histological examination.

Results: Combined red and blue PBM accelerated the process of reepithelization and formation of cross-linked collagen fibers compared with sham irradiated control wounds.

Conclusions: Our results demonstrate that the current dose of combined red and blue PBM improves the healing of sutured skin incisions in minipigs.