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Clinical Case Study of Low-level Laser Therapy

Low-level laser therapy (LLLT) accelerated healing and improved symptoms and outcome for second degree scalding burns on human skin for the subject patient.

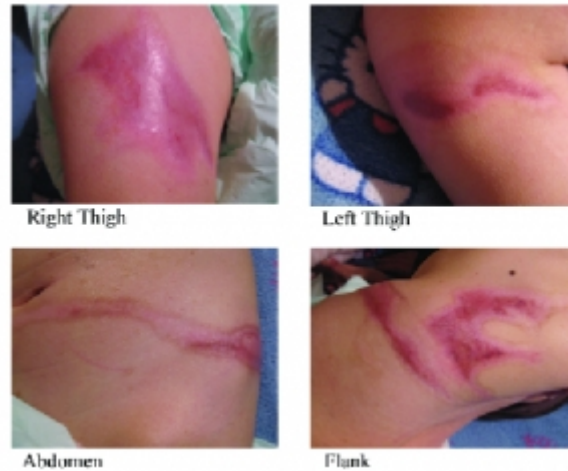
By Stephanie A. Leonard, DC, CCFC

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Case Study Summary

A 29-year-old Caucasian female, non ambulatory with cerebral palsy suffered second degree scalding water burns to right, left thighs, abdomen and flank that responded to LLLT as the principle treatment for wound case management. Over 14 weeks, the sizing of each lesion diminished as healed tissues replaced the necrotic tissues. There was no visible evidence of opportunistic bacterial infection or invasion. The newly replaced skin has shown evidence of increased tensile elasticity. Scar formation changed from raised margins to flattened, smooth blending patterns. Inflammatory markers (edema, redness, heat and pain) were in concert with the levels of tissue healing per

treatment with the laser. Waxy, white burned centers were replaced with healthier pink cutaneous tissues as granulation ensued. Increased lymphatic drainage allowed for cellular waste removal and reduction of inflammatory mitigators. Overall comfort level of the patient was improved each week as determined by demeanor and sleeping patterns.



(https://www.practicalpainmanagement.com/sites/default/files/imagecache/lightbox-large/import_files/html/P0904D04/fig3.png)

Figure 3.

Clinical Outcomes

The clinical outcomes in this case represent the speed, efficiency, and efficacy of the use of LLLT in cases of skin conditions. Wound care management is well cited in the literature of LLLT as well as in the protocols from various manufacturers since the inception of phototherapy in the 1960s.⁶⁻⁸

Because of the direct skin contact in this case, the visible outcomes of the effects of quantum medicine with second degree burns was seen rapidly at the cellular level—particularly due to the turnover rate at the epidermis.⁹ Most notable was increased vascularity using the 1000-3000Hz program.¹⁰

The rate of decreasing edema, increased lymphatic drainage, and increased phagocyte activity brought the reduction of central wound margins as the tissues were healing from the centers to the periphery. Increased fibroblastic activity was seen in the cellular proliferation rates between treatments. Increased collagen and epithelial production emerged new skin margins without overproduction of scarred inelastic tissues in the outer margins of the lesions.

Photonic emissions of laser diodes target injured cellular tissue components, primarily the chromophores, flavoproteins, and porphyrins.¹¹ Light energy transforms into biochemical energy which begins a sequence of events to activate ATP production and synthesis, transportation of nutrients and oxygen to damaged cells, removal of cellular debris via lymphatic drainage, and increased synthesis of signaling proteins—all of which result in accelerated healing.¹²

Summary

The mechanics of low power lasers to influence cellular ATP production is the key to increasing the rate of DNA synthesis. The wavelengths to stimulate this production are the 635nm and 820 nm ranges.¹³ The use of LLLT sources with these two wavelengths will induce more protein synthesis and result in increased cell proliferation benefiting, as in this case, burn wound repair. Low level laser does not raise the temperature of the tissue being irradiated by more than one degree, thus thermal damage is not possible and change comes via biochemical, bioelectrical, and biomagnetic effects.^{14,15} Repeated doses of pulsed laser light amplify cellular and systemic effects. Proper technique when scanning the injured tissues, frequency of treatments, as well as repair time intervals, and burn wound dressings consistent with medical protocols, all contributed to the efficient healing of the burn wounds and limitation of keloid and hypertrophic scarring.¹⁶⁻¹⁸ In this study, a non-invasive approach to wound repair was efficacious and should encourage clinicians to utilize this modality of LLLT to accelerate healing, and improve symptoms and outcomes for patients with potential burn scarring.

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