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Case Report

Role of low level laser therapy (LLLT) in healing of thermal burns

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Abstract

Aim of this case report is to assess the role of low level laser therapy (LLLT) in management of thermal burn wound. Clinical examination of the wound before and after the use of low level laser therapy was done. Low level laser therapy is effective in healing of superficial ulcers. LLLT may be used in raw area over thermal burns healing.

Keywords: Low level laser therapy, LLLT, Thermal burns

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1. Introduction

Management of thermal burn wound poses a challenge regarding improving the general condition of the patient and adequate dressing of the wound. If there is superficial to deep ulcers due to the thermal burns, one of the available methods of donor site wound care is low level laser therapy which is believed to affect the function of connective tissue cells (fibroblasts), accelerate connective tissue repair, and act as an anti-inflammatory agent.[1] The aim of this case report is to assess the role of low level laser therapy (LLLT) in management of thermal burn wound healing.

2. Materials and Methods

The study is done in a tertiary care hospital in South India. This is a case of 12 year-old male child with alleged history of accidental thermal burns injury to face, neck and left hand. The patient had a raw area over the face, left side neck and ear, dorsal aspect of left hand.

The patient underwent regular debridement and dressings in the plastic surgery department. The raw area site over left periauricular region (**Figure 1**) was treated with collagen scaffold dressing, LLLT, APRP and CINPWT and undergone FTSG. The graft over left periauricular region LLLT was given through LLLT comb everyday for 10 minutes for 1 week (**Figure 2**). Bates Jansen wound assessment tool (BJWAT) score was used pre laser usage and post laser usage to correctly check improvement in the wound.

3. Results

LLLT was useful in healing of the wound and fasten the wound healing in our patient (**Figure 3**). Bates Jansen wound assessment tool (BJWAT) score was used pre laser usage and post laser usage which changed from pre LLLT score of 19 to post LLLT score of 13.

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Figure 1: Deep burns in left per auricular region

Figure 2: LLLt over graft

Figure 3: Graft take and healed area after LLLT

4. Discussion

LASER can be abbreviated as "Light Amplification by Stimulated Emission of Radiation." Low Level Lasers has a power density at less than 500 mW/ cm21,[2] It is defined as low level laser as the energy used is very much less than that is used for cutting, ablation therapy. Low Level Laser Therapy (LLLT) is used as an adjuvant to available therapy, especially in patients with acute and bloody ulcers.[3] LLLT is a form of phototherapy that uses electromagnetic radiation capable of generating energy to interact with living tissues. It produces photochemical and photophysical effects and does not produce heat, with the intention of re-establishing cell homeostasis. Essentially, light energy is delivered topically in a controlled manner and is absorbed by photo-absorbers (chromophores) that transform it into chemical energy.[1]

Positive energy includes acceleration of tissue repair, improved formation of granulation tissue, accelerated wound contraction, decreased inflammation, modulation, and pain reduction.[5]

According to the literature, low-energy photo missions given at a wave length of 600 nm to 900 nm can accelerate cell proliferation and the wound healing processes.[6] It is thought to: Stimulate respiratory chain components such as flavin and cytochromes which increase adenosine tri phosphate (ATP) synthesis,[7] thus increasing the rate of mitoses and increasing fibroblast numbers,[8-12] promote collagen and elastin production, leading to better re-epithelialisation,[13] stimulates microcirculation and dilations of the capillaries and neovascularisation to increase tissue oxygenation,[14] release mediator substances such as histamine, serotonin and bradykinin in to influence macrophages, rejuvenate lymphatic vessels.

5. Conclusion

Low level laser therapy is found to be effective in improving wound healing in thermal burn raw area site in adjunct with other therapies, by accelerating connective tissue repair.

6. Conflicts of Interest

This study does not require any institutional approval.

7. Authors' Contributions

All authors made contributions to the article.

8. Financial Support and Sponsorship

None.

References

1. Avci P, Gupta A, Sadasivam M, Vecchio D, Pam Z, Pam N, Hamblin MR. Low-level laser (light) therapy (LLLT) in skin: stimulating, healing, restoring. *Semin Cutan Med Surg*. 2013;32(1): 41.
2. Lubart R, Wollman Y, Friedmann H, Rochkind S, Laulicht I. Effects of visible and near infrared lasers on cell cultures. *J Photochem Photobiol B*. 1992;12(3):305-10. https://doi:10.1016/1011-1344(92)85032-p
3. Wu W, Naim JO, Lanzafame RJ. The effect of laser irradiation on the release of bFGF from 3T3 fibroblasts. Photochem Photobiol. 1994;59(2):167-70. https://doi:10.1111/j.1751-1097.1994.tb05017.x.

4. Vinck EM, Cagnie BJ, Cornelissen MJ, Declercq HA, Cambier DC. Increased fibroblast proliferation induced by light emitting diode and low power laser irradiation. *Lasers Med Sci*. 2003;18(2):95-99. https://doi:10.1007/s10103-003-0262-x.
5. Frigo L, Fávero GM, Lima HJ, Maria DA, Bjordal JM. Low-level laser irradiation (InGaAIP-660 nm) increases fibroblast cell proliferation and reduces cell death in a dose-dependent manner. *Photomed Laser Surg*. 2010;28(1):S151-6. https://doi;10.1089/pho.2008.2475.
6. Basso FG, Oliveira CF, Kurachi C, Hebling J. Costa CA. Biostimulatory effect of low-level laser therapy on keratinocytes in vitro. *Lasers Med Sci*. 2013,28(2):367-74. https://doi:10.1007/s10103-012-1057-8.
7. Szymanska J, Goralczyk K, Klawe JJ, Lukowicz M, Michalska M. Phototherapy with low-level laser influences the proliferation of endothelial cells and vascular endothelial growth factor and transforming growth factor-beta secretion. *J Physiol Pharmacol*. 2013;64(3):387-91.
8. Moore P, Ridgway TD, Higbee RG, Howard EW, Lucroy MD. Effect of wavelength on low-intensity laser irradiation-stimulated cell proliferation in vitro. *Lasers Surg Med*. 2005;36(1):8-12. https://doi:10.1002/lsm.20117.
9. Agaiby AD, Ghali LR, Wilson R, Dyson M. Laser modulation of angiogenic factor production by T-lymphocytes. *Lasers Surg Med*. 2000;26(4):357-63. https://doi:10.1002/(sici)1096-9101(2000)26:4<357::aid-lsm3>3.0.co;2-o.
10. Evans R. Kolb B. Naim JO, Narayan V. In vitro effects of low-level laser irradiation at 660 nm on peripheral blood lymphocytes. *Lasers Surg Med*. 2000;27(3):255-6. https://doi:10.1002/1096-9101(2000)27:3<255::aid-lsm7>3.0.co;2-l.
11. Saygun 1, Nizam N, Ural AU, Serdar MA, Avcu F. Low-level laser irradiation affects the release of basic fibroblast growth factor (bFGF), insulin- like growth factor-1 (IGF-1), and receptor of IGF-I (IGFBP3) from osteoblasts. *Photomed Laser Surg.* 2012.30(3):149-54. https://doi:10.1089/pho.2011.3079.
12. Esmaeelinejad M, Bayat M. Effect of low-level laser therapy on the release of interleukin-6 and basic fibroblast growth factor from cultured human skin fibroblasts in normal and high glucose mediums. *J Cosmet Laser Ther.* 2013;15(6):310-7. https://doi:10.3109/14764172.2013.803366.
13. de Sousa AP, Paraguassú GM, Silveira NT, de Souza J, Cangussú MC. Laser and LED phototherapies on angiogenesis. *Lasers Med Sci*. 2013;28(3):981-7. https://doi:10.1007/s10103-012-1187-z.
14. Chen CH, Tsai JL, Wang YH, Lee CL, Chen JK. Low-level laser irradiation promotes cell proliferation and mRNA expression of type I collagen and decorin in porcine Achilles tendon fibroblasts in vitro. *J Orthop Res.* 2009;27(5):6-16- 650. https://doi:10.1002/jor.20800.

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