

## Efficacy of Low Level Laser Therapy (LLLT) in Burn Wound Management

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### Abstract

Low level lasers are low power lasers which have biostimulatory effects on wounds when exposed for short duration and energy. The bio-stimulatory effects of low level laser therapy (LLLT) have been found to be effective as adjuvant therapy to accelerate wound healing. It augments tissue repair and regeneration along with its anti-inflammatory and analgesic effects. This property of low level lasers can be used effectively for burn wound bed preparation as an adjuvant therapy. A 30 year female with old and infected thermal burns, measuring 15% of total body surface area was treated with Low level gallium arsenite Laser. Wound was debrided and LLLT was given for 10 minutes along entire raw area at weekly intervals for 3 sittings following which split skin grafting was done. It was notice that wound healing was enhanced, graft was taken successfully and no complications were noted. Through this article we would like to highlight the use of LLLT as an adjuvant therapy in burn wound healing.

**Keywords:** Burn; Wound Healing; Laser Therapy.

### Introduction

The use of lasers in medicine has always generated keen interest of doctors as well as patients. Low level

lasers are low power lasers which have biostimulatory effects on wounds when exposed for short duration and energy (<4J). This property of low level lasers can be used effectively for wound bed preparation as an adjuvant therapy. We present a case of 30 year old lady with 15% infected thermal burns treated successfully with low level laser therapy as adjuvant for wound bed preparation.

Low level laser therapy (LLLT) differs from traditional ablative or cutting lasers by the low energy density it delivers and its non-thermal mechanism<sup>1</sup>. Posten et al classified properties of low level lasers as lasers<sup>2</sup>-

1. Power output 0.001-0.1 watts
2. Wave length 300-10,600 nm
3. Pulse rate 0- 5000 hertz (cycles per second)
4. Dose 0.01 to 100 J.

We found low level laser therapy as an effective adjunct in wound bed preparation of an old and infected burn wound. Through this article we would like to highlight the use of LLLT for burn wound management.

### Case Report

A 30 year old lady presented with 15 % old thermal burns to right arm and right side chest and back. Burn wound was found to be infected and covered with eschar. Obvious dead tissue was debrided surgically. Wound culture was positive for MRSA and antibiotic was given according to culture sensitivity. Patient was treated hydrojet debridement followed by Low level laser therapy using gallium arsenite Laser was for 10 minutes along entire post burn area. Adequate

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laser protection was taken, wavelength specific goggles were used by patient, operating surgeon and other persons present in operation theatre. Procedure was repeated at weekly intervals up to three weeks. Wound was found to be covered with healthy granulation tissue following which Split Skin Grafting was done. Post operative Check dressings revealed that split skin graft was taken well and infection or graft loss was noticed.

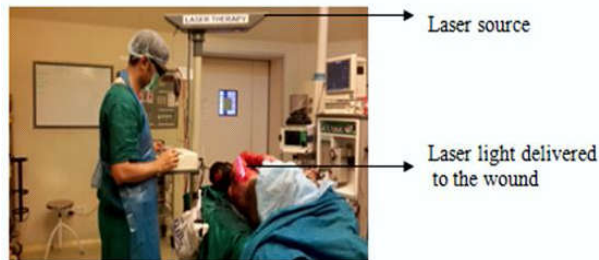


Fig. 1: Showing Laser therapy being given



Fig. 2: Showing pre operative well granulated wound bed



Fig. 3: Showing Skin grafting post operative



Fig. 4: Delayed post op picture showing well settled graft

## Discussion

LASER (Light Amplification by Stimulated Emission of Radiation) since its invention in 1960 and its first utility in the biomedical field in 1983 continues to evolve and improve technologically with the spectrum of its utility in the medical field expanding exponentially [3].

Commonly used LASERS for LLLT include gallium aluminum arsenide Ga-Al-As (805 or 650 nm), gallium arsenide Ga-As (904 nm), Krypton (521, 530, 568, and 647 nm), argon Ar (488 and 514 nm), helium neon He-Ne (632.8 nm) and ruby (694 nm) [2]. LLLT has known to have bio-stimulatory effects on wound healing to augment tissue repair and regeneration along with its anti-inflammatory and analgesic effects [4]. It has also been used for photo rejuvenation of photo damaged skin, wrinkles and scars [5].

The following biological effects of low level laser therapy include decrease in inflammatory cells, decreased synthesis of inflammatory mediators, increased secretion of growth factors, increase in proliferation of fibroblasts, increase in collagen synthesis, stimulation of angiogenesis & stimulation for formation of granulation tissue [6]. The photo biological effects of low level laser therapy depends on the wavelength, dose, power and duration of application [7]. The biostimulatory effects of low level laser therapy have been found to be effective as adjuvant therapy to accelerate wound healing. Burn wound healing can be augmented by use of LLLT as an adjuvant to other measures [8,9].

## Conclusion

We found that Low level Laser therapy can be successfully used as an adjuvant therapy in burn wound management, however large volume studies need to be performed to confirm the same.

*Conflicts of Interest:* Nil

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