

Role of Low Level Laser Therapy (LLLT) in Pressure Sore Management

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Abstract

There are situations when patients are unfit for anesthesia or unwilling for surgery when plastic surgeon has to make the wound heal by secondary intention. In such situations adjunct therapies like Low Level Laser (LLL) helps in promoting wound healing. LLL are lasers with a wave-length between 600 and 1000 nanometers and power from 5 to 500 Mw. The bio-stimulatory properties of LLL has been found to accelerate wound healing, tissue repair and regeneration. This study highlights the application of LLL in a 40-year-old male with multiple pressure sores unfit for anesthesia.

Keywords: Pressure Sore; Wound Healing; Low Level Lasers.

Introduction

Endre Mester, a Hungarian physician initiated the use of Low level laser therapy (LLLT) in 1960 which received FDA approval in the early 1990's [1]. LLL do not produce any heat in contrast to cutting or ablative lasers used in medicine [2]. When given for short duration and energy (<4J), they have been found to have

bio-stimulatory effects on wound healing. This property of LLLT of accelerating wound healing has been used as adjuvant in the management of various wounds. We present a 40 year old gentleman with post traumatic paraplegia with multiple pressure sores (stage II) over bilateral scapular, trochanteric and sacral regions, unfit for anesthesia who was treated successfully with LLLT as an adjuvant to pressure sore management. The properties of LLL as described by Posten et al are dose 0.01 to 100 J, wave length 300-10,600 nm, pulse rate 0- 5000 hertz (cycles per second) and power output 0.001-0.1 watts [3].

We found low level laser therapy as an effective adjunct in pressure sore management and through this article we would like to highlight the use of LLLT in pressure sores.

Case Report

A 40 year old gentleman presented with post traumatic paraplegia with multiple pressure sores (stage II) over bilateral scapular, trochanteric and sacral regions. He was poorly built and malnourished. The pressure sores were large infected raw areas covered with slough. Obvious dead tissue was surgically debrided. Wound culture was found to be positive for MRSA, B hemolytic streptococcus which was treated with antibiotic as per culture sensitivity. Patient was started on high protein diet with supplemental nutrition. Patient was treated with Hydrojet debridement and LLLT using gallium arsenite laser for 10 minutes along raw areas of each bed sore followed by a moist dressing with NPWT. Laser safety and precautions were maintained as per international standards. Procedures were repeated every 3rd day for 1 month. The pressure sores were found to be covered with healthy granulation by 2

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weeks which later epithelized and reduced to half its size within a month inspite of under-nourished status of the patient.



Fig. 1: Showing pressure sore at presentation

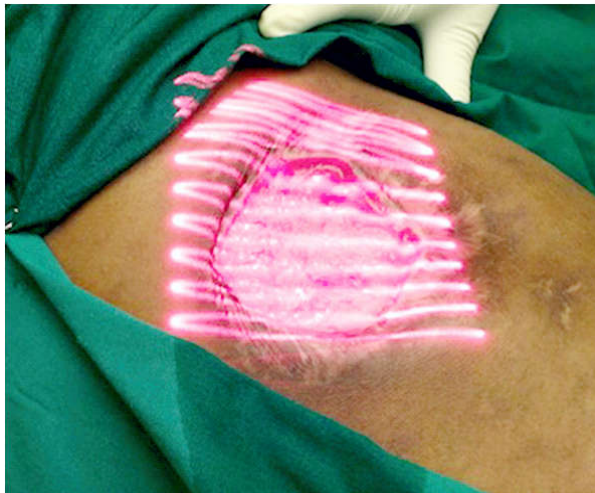


Fig. 2: Showing Laser therapy being given



Fig. 3: Showing pressure sores at 4 weeks

Discussion

The management of pressure sores involves multimodality treatment with excellent nursing care. It involves alpha bed care, change of position every 20 mins, prevent weight bearing of pressure points, nutritional optimization, bowel bladder care, wound management, gentle physiotherapy and treatment of primary disease if possible. Wound management should be performed as per SWCR guidelines [4].

LLL are also known as low-power lasers, soft laser, cold laser, biostimulation laser, therapeutic laser, and laser acupuncture. LLLT has analgesic, anti-inflammatory actions along with stimulatory effects on wound healing, tissue repair and regeneration [5]. At the cellular level, the effects of LLLT are as follows [6,7]:

- Increases cellular metabolism
- Stimulates cell growth
- Increase in proliferation of fibroblasts
- Reduces fibrous tissue formation
- Promotes cell regeneration
- Increase in collagen synthesis
- Reduces edema formation
- Increase synthesis of growth factors
- Decrease in inflammatory cells
- Reduces synthesis of inflammatory mediators like substance P, bradykinin, histamine and acetylcholine production
- Stimulates production of nitric oxide
- Stimulates nerve regeneration and function
- Stimulates endorphins production
- Stimulation of angiogenesis
- Stimulation for formation of granulation tissue

The photobiological effects of LLLT depends on power, wavelength and duration of application [8]. The commonly used LLLT LASERS include Gallium Arsenide Ga-As, Gallium Aluminum Arsenide Ga-Al-As, Krypton, Helium Neon He-Ne, Ruby and argon Ar [3]. It has been used to treat acute and chronic pain, photo rejuvenation of photodamaged skin, wrinkles and scars, hair loss, dentistry and wound management including burns [9]. LLLT has been found to be effective as adjuvant therapy in wound management due to its biostimulatory properties. The use of LLLT as an adjuvant treatment modality for treatment of pressure sores can augment and accelerate wound healing.

Conclusion

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

Conflicts of interest : None

Disclosures: None

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