

Role of Low Level Laser Therapy in Cross Leg Flap

Sushanth Kaushal¹, Ravi Kumar Chittoria², Jacob Antony³

How to cite this article:

Sushanth Kaushal, Ravi Kumar Chittoria, Jacob Antony. Role of Low Level Laser Therapy in Cross Leg Flap. J Orth. Edu. 2023;9(3):173-175.

Abstract

Low Level Laser Therapy (LLLT) has a stimulatory effect on raw areas and wounds by improving granulation. Cross leg flap from the opposite healthy leg is one of the options of donor site for flaps inn leg defects. However there is a risk of necrosis of the distal part of the flap, which may lead to flap failure. Low level laser therapy is one method to improve vascularity of the flap.

Keywords: Low level laser therapy; Cross leg; Flap.

INTRODUCTION

Local flaps are commonly used for coverage of defects especially with significant soft tissue loss. In cases of lower extremity wounds requiring flaps, local advancement or transposition flaps may not be feasible due to limited donor tissue. Free flaps may be cumbersome to use owing to the

requirement of microvascular surgical procedure. Cross leg flap from the opposite healthy leg is one of the options of donor site for flaps. However there is a risk of necrosis of the distal part of the flap, which may lead to flap failure. Blood supply to the flap may be improved by tubularisation of the flap, i.e. suturing of the distal part of the flap close to the pedicle to allow for more blood vessels to grow into and supply the distal part of the flap. Another method is by use of low level laser therapy to improve vascularity of the flap.¹

Author Affiliation: ¹Junior Resident, Department of Orthopedics, ²Professor, Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, ³Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor, Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

E-mail: drchittoria@yahoo.com

Received on: 29.04.2023

Accepted on: 15.05.2023

MATERIALS AND METHODS

The study is done in a tertiary care hospital in South India. The subject is a 65 year old male patient, with no known comorbidities, with a history of injury to right lower limb 9 months ago due to road traffic accident. At the time of presentation 9 months ago in emergency medical services he had lacerated wound with degloving, exposed bone with tibial periosteal stripping and 12 cm of tibial bone loss. He underwent external fixation and bone debridement. He underwent multiple

sessions of debridement over 4 months. Currently, he is admitted for planning for reconstruction of the bone defect in the right leg. He underwent creation of tubularised cross leg flap (Fig. 1) from the left leg for restoring tissue bulk in the region of tissue defect in the right leg. During the course of his hospital stay he has received transfusions of packed red cells.



Fig. 1: Cross leg Flap raised on left lower leg

He has undergone 6 sessions of low level laser therapy (LLLT - Fig. 2) and wound debridement. Continuous negative pressure wound therapy was started. Currently the general condition of the patient is fair, there are no complaints of pain, and the negative pressure dressing over the left leg flap donor site is intact with no soakage of the dressing. The tubularised flap appears healthy with good blood supply.



Fig. 2: Low level laser therapy being given to the cross leg flap

RESULTS

LLLT was tolerated very well by the patient.

No complication was noticed. LLLT was useful in improving the blood supply of flap to prevent its necrosis (Fig. 3).



Fig. 3: After four session of Low level laser therapy flap necrosis was prevented

DISCUSSION

Low level laser therapy is generated from G-As (gallium-arsenide) laser. LLLT acts by photo biomodulation.² It has effect on cell proliferation, metabolism, angiogenesis, apoptosis and inflammation.³ Effective LLLT utilises wavelength of red to near infrared (600-1070 nm). LLLT acts on cytochrome c-oxidase, promotes nuclear factor kappa b which promotes cell proliferation and anti-apoptotic action.⁴ It also upregulates VEGF which promotes angiogenesis. Low level laser is applied by scanning mode and adjusted to cover the region of the wound. Application is for 5-10 minutes per weekly session.⁵ It has a stimulatory effect on raw areas and wounds by improving granulation. It softens scars by reducing fibrous tissue formation, improves blood supply and promotes nerve regeneration.⁶ It has an anti-inflammatory action, the mechanism of which is not clearly elucidated.

CONCLUSION

Low Level Laser Therapy is found to be useful in preventing the flap necrosis. Large randomised controlled trials are required to substantiate our result.

Conflicts of Interest: None.

Disclosures & Declarations: None.

Authors contributions: All authors made contributions to the article.

Financial support and sponsorship: None.

REFERENCES

1. Hopkins JT, McLoda TA, Seegmiller JG, David Baxter G. Low level laser Therapy Facilitates superficial wound healing in humans: a triple-blind, sham-controlled study. *J Athl Train.* 2004; 39:223-229.
2. Gaida K, Koller R, Isler C, Aytekin O, Al-Awami M, Meissl G, Frey M. Low level Laser Therapy – a conservative approach to the Burns. 2004;30:362-367.
3. Gupta AK, Filonenko N, Salansky N, Sauder DN. The use of low energy photon therapy (LEPT) in venous leg ulcers: a double-blind, placebo-controlled study. *Dermatol Surg.* 1998;24:1383-1386.
4. Widgerow AD, Chait LA, Stals R, Stals PJ. New innovations in scar management. *Aesthetic Plast Surg.* 2000;24:227-234.
5. Van der Helder CJ, Hage JJ. Sense and nonsense of scar creams and gels. *Aesthetic Plast Surg.* 1994;18:307-313.
6. Nouri K, Vidulich K, Rivas MP. Lasers for scars: a review. *J Cosmet Dermatol.* 2006;5:14-22.

