PHOTOBIOMODULATION THERAPY (BLUE LIGHT) AS ADJUNCT TREATMENT FOR CHRONIC AND NON HEALING ULCER: CASE SERIES

[1]Abdul Rahman Aziz Satar, [1]Chew Shao Yann, [1]Liew May San, [1]Khairul Hafidz Abd Rahman, [1]Fazirah Mohd Rizal, [1]Hisam Maarof, [1]M Saat, [2]Ahmad Faizal Abdullah

[1]Wound Care Unit, Hospital Melaka
[2]Orthopaedic Department, Hospital Melaka

WOUNDBUSTERS
THE LEGACY

D-FOOT INTERNATIONAL, APADLP &
5TH GLOBAL WOUND CONFERENCE 2023

6TH -8TH OCT, 2023 • SUNWAY PYRAMID CONVENTION CENTRE, SELANGOR, MALAYSIA

INTRODUCTION

Chronic non healing ulcers present a significant challenge in wound care practice characterized by its recalcitrance to standard therapeutic intervention. Long term chronic wound often imposes a compromise to patient's quality of life as it affects their daily activity. Latest breakthrough innovation for chronic wound treatment include adding on Photobiomodulation Therapy (PBM) to the standard wound care practice. Introducing a hand-held device that emit blue LED light in the 400-420nm spectrum on the wound bed has been proven to resolve chronic wound inflammation and enable faster and better tissue regeneration for chronic wound.

OBJECTIVE

This study aimed to evaluate the therapeutic impact of PBM therapy as an adjunct treatment in patients with chronic non healing ulcers.

Figure 1: PBM Device

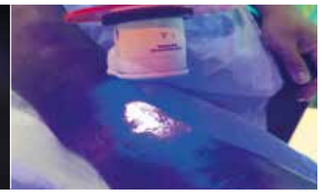

Figure 2 Procedure of PBM on patient

CASE SUMMARY

A case series involving three patients with chronic non healing ulcers was conducted. All the wound receives hospital wound team standard of care, wound was measured and cleansed before using Photobiomodulation Therapy.

- **Case 1**
  71 years old Malay female, diagnosed with chronic non healing ulcer over his right ankle.
- **Case 2**
  54 years old Indian male with underlying Diabetes Mellitus and hypertension presenting with chronic venous ulcer over his left lower limb for almost 3 years.
- **Case 3**
  A 30-year-old Chinese male with periventricular germinoma complicated with panhypopituitarism presented with a non-healing pressure injury over the right big toe. The ulcer had been present for almost 3 years

RESULTS

The outcome was evaluated based on wound measurement and clinical observation during follow up appointment. One wound achieved complete healing, while the remaining two are 74.55% to 91.11% in terms of wound area reduction with new epithelialization tissue present, indicating a positive healing progress as compared to earlier chronic stasis stage.

DISCUSSION

The observed therapeutic outcomes align with previous research highlighting that PBM is an effective adjunct therapy in chronic non healing ulcers that promote better wound healing. PBM light spectrum 400-420nm irradiated on chronic wound bed will stimulate Flavins (light receptor) to produce Reactive Oxygen Species (ROS). ROS stimulate the pro-inflammatory macrophage M1 transition to M2 that rapidly resolve wound inflammatory phase. This would enable the release of pro-angiogenetic factors like VEGF and eNOS to promote angiogenesis. Other than resolving wound inflammation, the effect extend to reducing pain in patients. Further research is needed to investigate the efficacy of this treatment method in larger populations.

ACKNOWLEDGEMENT

1. Director General of Health, Ministry of Health
2. Director of Hospital Melaka

REFERENCES

1. *Davide Vincenzo Verdolino, Helen A. Thomason, Andrea Fotticchia, Sarah Cartmell; Wound dressings: curbing inflammation in chronic wound healing. Emerg Top Life Sci 29 October 2021; 5 (4): 523–537. doi: https://doi.org/10.1042/ETLS20200346*
2. *Dompe C, Moncrieff L, Matys J, Grzech-Leśniak K, Kocherova I, Bryja A, Bruska M, Dominiak M, Mozdziak P, Skiba THI, Shibli JA, Angelova Volponi A, Kempisty B, Dyszkiewicz-Konwińska M. Photobiomodulation-Underlying Mechanism and Clinical Applications. J Clin Med. 2020 Jun 3;9(6):1724. doi: 10.3390/jcm9061724. PMID: 32503238; PMCID: PMC7356229.*
3. *Haalboom M. Chronic Wounds: Innovations in Diagnostics and Therapeutics. Curr Med Chem. 2018;25(41):5772-5781. doi: 10.2174/0929867324666170710120556. PMID: 28699502.*
4. *Im MJ, Hoopes JE. Energy metabolism in healing skin wounds. J Surg Res. 1970 Oct;10(10):459-64. doi: 10.1016/0022-4804(70)90070-3. PMID: 5476457.*
5. *Nair HKR, Chong SSY, Selvaraj DDJ. Photobiomodulation as an Adjunct Therapy in Wound Healing. Int J Low Extrem Wounds. 2023 Jun;22(2):278-282. doi: 10.1177/15347346211004186. Epub 2021 May 11. PMID: 33973828.*

CASE 1

Figure 1: Chronic Non Healing Ulcer over right ankle

1st Week
Wound Size: 45cm^2
Pain Score: 4

10 Weeks
Wound Size: 4cm^2
Pain Score: 0

Percentage of Wound Reduction (%) 91.11

CASE 2

Figure 2: Chronic Venous Ulcer over Left lower limb

1st Weeks
Wound Size: 47cm^2
Pain Score: 4

10 Weeks
Wound Size: 12cm^2
Pain Score: 0

Percentage of Wound Reduction (%) 74.55

CASE 3

Figure 3: Non Healing Pressure Injury over right big toe

1st Weeks
Wound Size: 3.5cm^2
Pain Score: 2

4 Weeks
Wound Size: Healed
Pain Score: 0

Percentage of Wound Reduction (%) 100

SOZA HEALTHCARE Sdn Bhd