Preliminary evaluation of biophotonic therapy in chronic wounds

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Introduction

A new biophotonic technology uses the interaction between light and photo-activated oxygen-rich gel formulations (chromophores) to treat acute and chronic wounds. The combination of the wavelenghts emitted from the multi-LED lamp and the chromophores, contained in the gels is particularly effective to promote healing. This technology has been shown to induce biological effects such as a decrease of inflammatory cells and bacteria, an increase of fibroblast proliferation, simulation of angiogenesis, granulation tissue formation and an increased synthesis of collagen. (Fig. 1a-b)

Materials and Methods

A total of 10 patients with chronic wounds non responsive to standard treatments were treated twice a week for 4 months with biophotonic technology. The gel was applied to the wound bed and was illuminated for 5 minutes by using the dedicated light. After treatment the wound bed was cleansed using saline solution and moisture-balancing dressings with short compression bandaging system applied (Fig.2-a,-b,-c). A weekly clinical and instrumental evaluation of the chronic wounds was performed. The wound bed score validated by Falanga in 2006 was used for clinical assessment and the wounds size was assessed with a laser scanner system (Fig. 3). Patients measured the level of their pain on a 100-mm VAS scale.

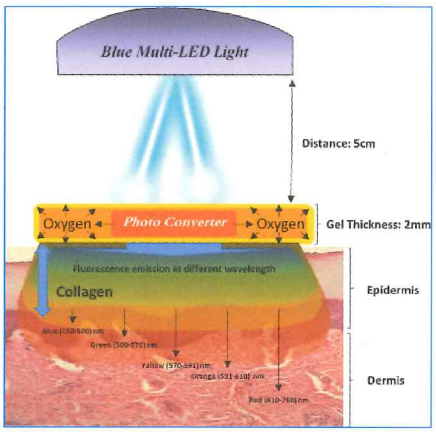

Fig. 1a

Fig. 1b

g. 2a

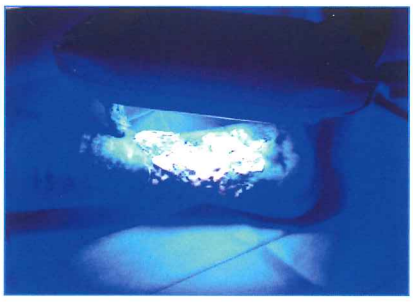

Fig. 2b

Fig. 2c

Fig. 3 Silhouette Star (Aranz®)

Results

Regarding the wound area 3 patients were completely healed, 4 patients had significant mean change in wound size and 3 patients did not show significant improvements in terms of area reducation. Two of the last three patients withdrew, one due to the development of an erysipelas and the other due to personal problems (Fig 4). The VAS scale showed marked changes immediately after one week of treatment in all patients (Fig 5). The Wound bed score (WBS) improved in 9 patients while in one patient remained stable (Fig 6).

Fig. 7a

Fig. 7b

Fig. 7c

Fig 7 a, b, c Patient before (a) and after 1 month of treatment (b), and the patient healed (c)

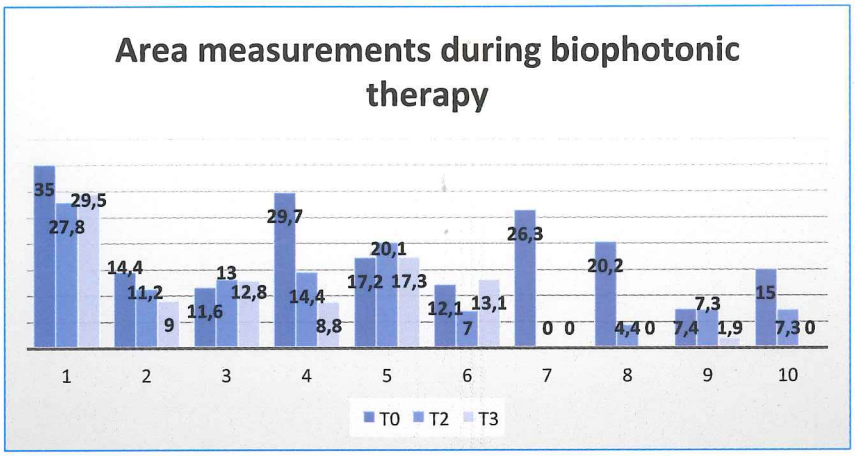

Fig 4. Area measurements (cm^2) in 10 patients

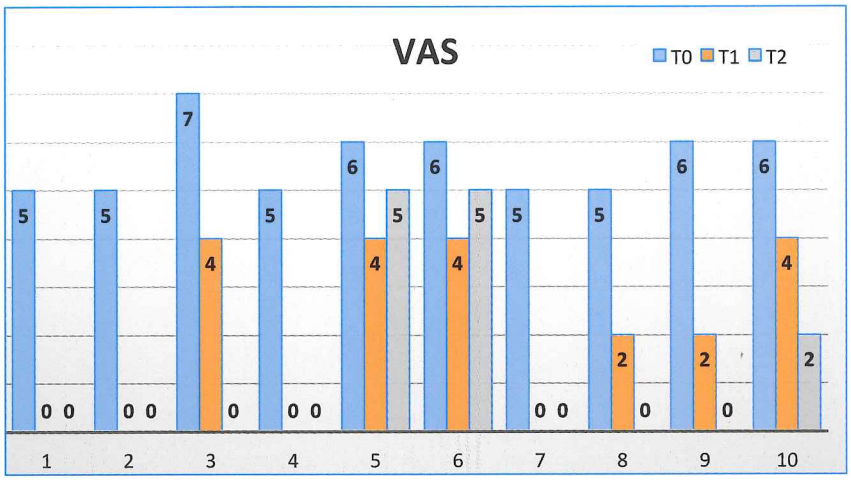

Fig 5. VAS in 10 patients

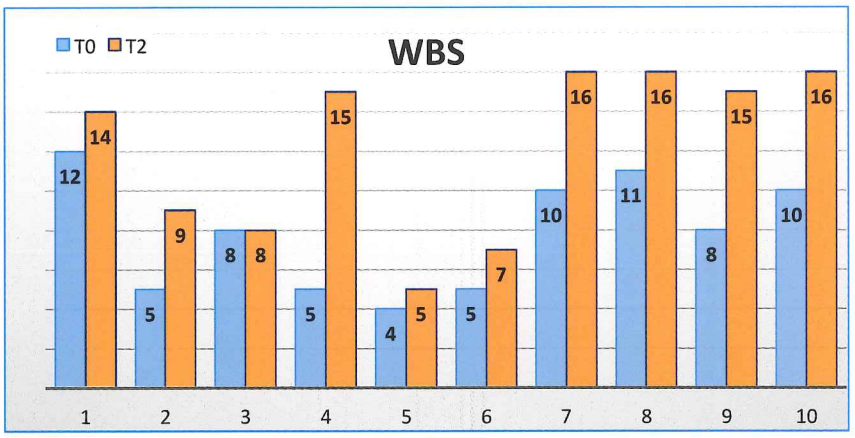

Fig 6. WBS in 10 patients

Discussion

From this preliminary data the biophotonic treatment seems to be effective, safe and provide an improvement in patient's quality of life. It is important however to better understand the molecular events that are involved in the wound healing process and therefore necessary to perform larger clinical trials.

References

Falanga V et al Wound bed score and its correlation with healing of chronic woundsDermatol Ther 2006 Nov-Dec.

Romanelli M et al Clinical evaluation of a wound measurement and documentation system 2008