

# Red-light therapy in recalcitrant acne - a case series

## Abstract

The use of various light sources is being increasingly tried in various dermatological conditions like acne, skin rejuvenation, and chronic ulcers to name a few. Red-led light therapy (633nm) is a cost-effective and simple procedure that gives promising results, especially for the inflammatory type of acne vulgaris. In this case series, we present three patients with inflammatory acne who were non-responsive to most of the anti-acne therapy but responded dramatically with red-led light therapy.

**Keywords:** low-level light therapy (LLLT), red-led light therapy, acne vulgaris, inflammatory acne, recalcitrant acne

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## Introduction

Low-level light therapy is a simple treatment procedure that works by photo biomodulation and in turn altering the cellular function.<sup>1</sup> The effects of light therapy on fibroblasts, cytokine synthesis by macrophages and sebaceous gland have been studied.<sup>2,3</sup> It's been used for the reduction of fine lines, wrinkles, skin roughness, acne and increasing intradermal collagen density.<sup>1</sup>

The observation of improvement in acne after exposure to sunlight led to the development of light therapies and lasers for acne over two decades.<sup>4,5</sup> Although there is a plethora of medical and procedural treatments available for acne, some recalcitrant cases can pose a big challenge to dermatologists. The long duration of treatment, high cost, and the side effects experienced are the drawbacks of conventional acne treatments.<sup>6</sup> Red-led light therapy is a simple, safe, and cost-effective treatment modality for acne vulgaris which came to our rescue when nothing else was effective. Here, we used Philips red led light (230V, 100W – R95E; made in Poland – Figure 1). **The cases are from Sparsh skin hair & laser clinic, Belagavi, India.**

2). She had been applying over-the-counter steroid creams for over a year. Initially, she was asked to stop the cream and was started on a combination of adapalene-clindamycin gel and sunscreen. Within a matter of 3 weeks, she developed extensive tender erythematous papulo-nodular acne (due to steroid withdrawal, Figure 3). In order to achieve rapid control, we treated her with 2 sessions of Jessner's peel 3 weeks apart along with pulse steroids orally. The remissions were very brief and she relapsed quickly. Hence as an alternative, red-led light therapy was started after stopping all her previous treatment. Light therapy was done twice weekly with four minutes duration, over each side of the face for 3 weeks. Within three weeks of starting treatment, all her inflammatory papulo-nodular acne lesions resolved (Figure 4). No post-procedural side effects were noted. After attaining complete remission, she was started on isotretinoin and continued with a weekly session of red-light therapy for 6 more weeks after which she was weaned off from light therapy. The patient is still on regular follow up with us for last 8months without any relapse and visibly excellent results.



**Figure 1** Showing Philips red led light (230V, 100W – R95E; made in Poland).

## Case I

A 17-year-old girl presented to us with extensive comedonal (both open and closed) acne over the face for four months (Figure



**Figure 2** Showing extensive comedonal acne over face at presentation.



**Figure 3** Showing erythematous papulonodular acne after withdrawing steroid creams.



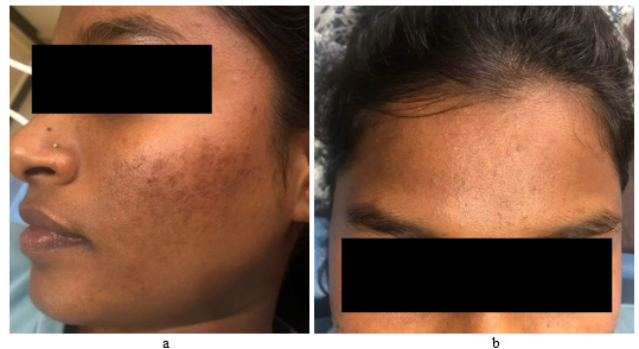
**Figure 4** Showing improvement of the papulonodular acne after 6 sittings of red led light therapy.

### Case 2

A 24-year-old female presented to us with erythematous papulo- nodular acne with a lot of comedones over her face (Figure 5a & Figure 5b). She had been using triple combination cream (Hydroquinone+Mometasone+tretinoin) for over a year, to look fairer. She was asked to stop the triple combination cream and underwent 3 sittings of peel (TCA, Jessner's, and Salicylic acid) one month apart along with oral isotretinoin for nearly three consecutive months with a waxing and waning course. Hence, we started the patient on red-led light therapy for four minutes on each side of the face, twice weekly. After 6 sittings of the treatment, all the papulo-nodular and comedonal acne lesions resolved with no side effects (Figure 6a & Figure 6b). She was maintained on isotretinoin for another 2 months during which we did not see any relapse.



**Figure 5** Showing second patient with comedones, papules and nodules over face and forehead.



**Figure 6** Showing improvement of the comedones, papulo-nodules after 6 sittings of light therapy.

### Case 3

A 24-year-old male patient presented with comedones, papules, and nodules over the face (Figure 7). He was started on oral isotretinoin, topical adapalene-clindamycin, and sunscreen. The patient did not show any signs of improvement even at 4 weeks. Hence, for this patient also, we started red light therapy. After starting light therapy with twice weekly sessions, lesions started to resolve. After 5 sittings of red-led light therapy, his inflammatory lesions almost resolved (Figure 8). No side effects were experienced by the patient either during the procedure or post-procedure.



**Figure 7** Showing comedones, papules, nodules over face.



**Figure 8** Showing improvement of lesions after 5 sittings of light therapy.

## Discussion

LLLT was first used in humans for the treatment of non-healing ulcers.<sup>7,8</sup> LLLT has been successfully used in treatment of acne, skin rejuvenation, chronic ulcers, and in patients with androgenetic alopecia.<sup>1,5,9</sup> Its use in traumatic brain injury (TBI), stroke, spinal cord injury, and degenerative conditions of the central nervous system can be explained by the increase in mitochondrial activity, activation of transcription factors, apoptosis inhibition, neo-angiogenesis, and neurogenesis.<sup>10,11</sup> Using LEDs instead of coherent laser light has been a great evolution to reduce the cost of procedures using photobiomodulation.<sup>10</sup>

Red light has deeper penetration and it is shown to reduce sebum production and also effects the keratinocytes. It actively destroys cutibacterium acnes present in the lower parts of the sebaceous gland.<sup>3</sup> The anti-inflammatory properties are attributed to its influence on cytokine production by macrophages. Production of fibroblast growth factor (FGF) from photoactivated macrophage-like cells helps to repair the damaged dermal matrix.<sup>2</sup> The dual action proves to be especially beneficial in not just reducing acne and post inflammatory erythema but also in reducing scarring in severe acne.

Antibiotic resistance, steroid abuse, and hormonal factors can contribute to recalcitrant acne. Early and adequate therapy can help to minimize the scarring and psycho-social impact. Management of recalcitrant acne is still a therapeutic challenge and non-invasive procedures like red-led light therapy can help a lot in such conditions. Significant reduction of inflammatory lesions were noted in all three cases and were surprisingly faster than the conventional acne treatments. Red-led light therapy can help in reduction of the total treatment duration if combined with conventional treatment. There were no side effects experienced by the patients while undergoing light therapy except for warmth during the session as described in literature.<sup>12,13</sup> The major limiting factor is that it has to be administered as a twice weekly regimen which is quite a challenge for most patients.

## Conclusion

Red-led light therapy is a simple, safe, cost-effective and non-invasive procedure that provides promising results in inflammatory acne. It can be tried in delayed-responders, those with antibiotic resistance and steroid-modified inflammatory acne lesions.<sup>3</sup>

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## Conflicts of interest

The authors declare no conflict of interest.

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## References

1. Wunsch A, Matuschka K. A controlled trial to determine the efficacy of red and near-infrared light treatment in patient satisfaction, reduction of fine lines, wrinkles, skin roughness, and intradermal collagen density increase. *Photomed Laser Surg.* 2014;32(2):93–100.
2. Young S, Bolton P, Dyson M, et al. Macrophage responsiveness to light therapy. *Lasers Surg Med.* 1989;9(5):497–505.
3. Ross EV. Optical treatments for acne. *Dermatol Ther.* 2005;18(3):253–266.
4. Rai R, Natarajan K. Laser and light-based treatments of acne. *Indian J Dermatol Venereol Leprol.* 2013;79(3):300–309.
5. Rotunda AM, Bhupathy AR, Rohrer TE. The new age of acne therapy: light, lasers, and radiofrequency. *J Cosmet Laser Ther.* 2004;6(4):191–200.
6. Aziz-Jalali MH, Tabaie SM, Djavid GE. Comparison of red and infrared low-level laser therapy in the treatment of acne vulgaris. *Indian J Dermatol.* 2012;57(2):128–130.
7. Mester E, Nagylucskay S, Döklen A, et al. Laser stimulation of wound healing. *Acta Chir Acad Sci Hung.* 1976;17(1):49–55.
8. Mester EN, Szende B, Spiry T, et al. Stimulation of wound healing by laser rays. *Acta Chir Acad Sci Hung.* 1972;13(3):315–324.
9. Leavitt M, Charles G, Heyman E, et al. HairMax LaserComb® laser phototherapy device in the treatment of male androgenetic alopecia: A randomized, double-blind, sham device-controlled, multicentre trial. *Clin Drug Investig.* 2009;29(5):283–292.
10. Chung H, Dai T, Sharma SK, et al. The nuts and bolts of low-level laser (light) therapy. *Ann Biomed Eng.* 2012;40(2):516–33.
11. Hashmi JT, Huang YY, Osmani BZ, et al. Role of low-level laser therapy in neurorehabilitation. *PM&R.* 2010;2(12 Suppl 2):S292–S305.
12. Goldberg DJ, Russell BA. Combination blue (415 nm) and red (633 nm) LED phototherapy in the treatment of mild to severe acne vulgaris. *J Cosmet Laser Ther.* 2006;8(2):71–75.
13. Lee SY, You CE, Park MY. Blue and red-light combination LED phototherapy for acne vulgaris in patients with skin phototype IV. *Lasers Surg Med.* 2007;39(2):180–188.