

# Fluorescent light energy: A new therapeutic approach to effectively treating acne conglobata and hidradenitis suppurativa

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## Abstract

The Kleresca® biophotonic platform utilizing fluorescent light energy (FLE) effectively treated both acne conglobata and hidradenitis suppurativa. FLE decreased the presence of inflammatory nodules, cysts, and associated erythema. It also supported a healing response to improve skin texture. FLE offers a new treatment approach to recalcitrant inflammatory skin conditions.

## KEYWORDS

biophotonic platform, fluorescent light energy, inflammation

## 1 | INTRODUCTION

Acne conglobata (AC) is a rare yet severe form of nodulocystic acne. Like acne vulgaris, *Cutibacterium acnes* (formerly *Propionibacterium acnes*) is thought to play a role in the pathogenesis of AC, which is characterized by a chronic inflammatory state. It presents with deep burrowing abscesses that connect via tunneling wounds (sinus tracts).<sup>1</sup> It can be found throughout the body, presenting as extensive comedones, nodules, and cystic lesions. This is an unpleasant condition, whereby cysts can contain foul-smelling pus that can weep.<sup>1</sup> Tissue remodeling and body disfigurement are associated with AC, where both hypertrophic and atrophic scars are common<sup>2</sup> and can lead to significant psychological impairment and isolation.<sup>1</sup> The pathology of AC resembles hidradenitis suppurativa (HS), which also features large sensitive nodules and draining sinus tracts. In both cases, the active areas are severely inflamed and unstable.<sup>3</sup> Systemic therapy with isotretinoin is the most common treatment choice for severe cystic acne. However, it is not effective in all cases,<sup>4</sup> or inappropriate in others; for example, in young adults or women hoping to conceive.<sup>5</sup> Therefore, new

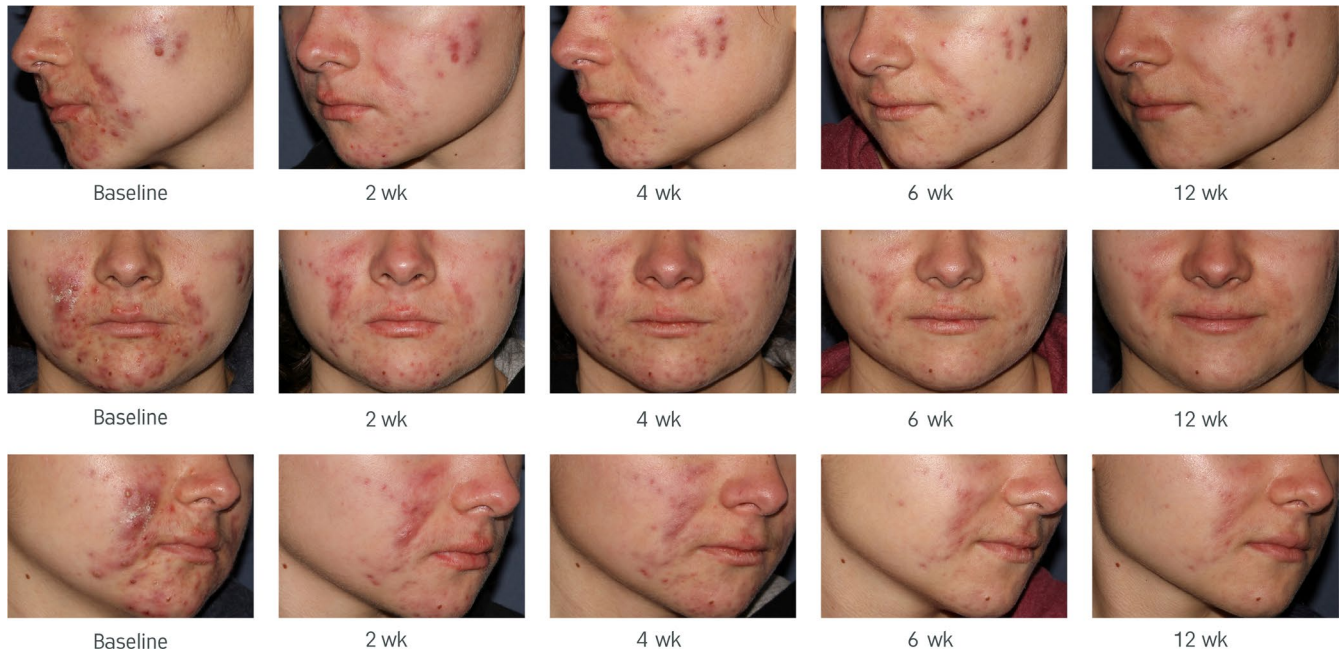
treatment options for this debilitating condition are needed. Fluorescent light energy (FLE) which induces a novel form of photobiomodulation (PBM) is successful in treating an array of inflammatory skin conditions<sup>6</sup>; therefore, we examined the efficacy of FLE in a case of AC and HS.

## 2 | MATERIALS AND METHODS/ CASE REPORTS

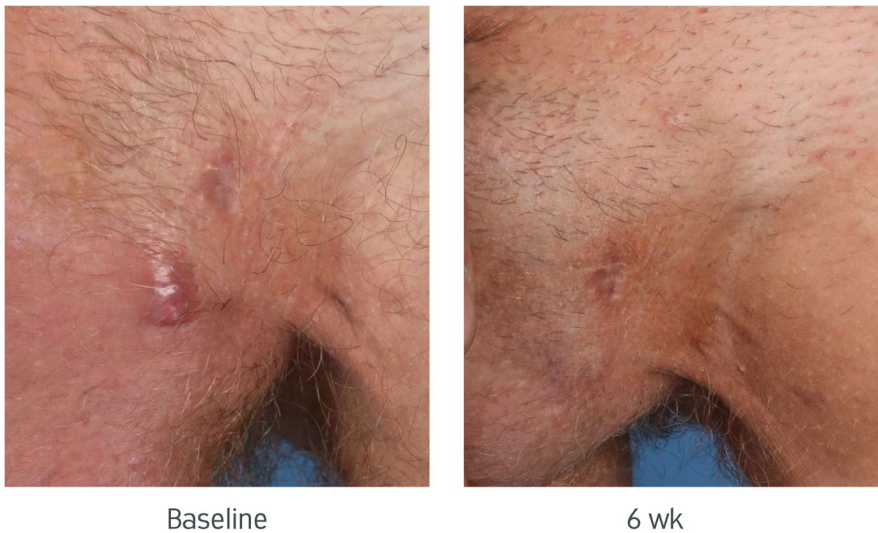
A 14-year-old girl who has suffered with AC from the age of 9 years presented with extensive papules, severe nodules, and cystic lesions, mostly affecting the cheeks and chin area of the face (Figure 1). Initially, the nodular lesions partially mimicked a pimple, but underneath there was a strong inflammatory reaction and the formation of pus. The skin lesions were large and engorged with fluid. They continued to grow and fill with pus until they eventually ruptured. Previous treatment with topical isotretinoin was ineffective and the patient was not a candidate for systemic isotretinoin since she was a professional handball player. The patient was treated twice weekly for 6 weeks,

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**FIGURE 1** Acne conglobata patient at baseline (before treatment) displaying severe papules, nodules, and cysts, concentrated on the chin and cheeks. Improvement in the appearance of the papules and cysts is evident during the treatment, at week (wk) 2 and 4. At the end of the treatment (week 6), there is a further reduction in the inflammatory lesions. The improvement is maintained 12 wk after the start of treatment, along with a notable decrease in the associated erythematous reaction and an improvement in the overall texture of the skin.



**FIGURE 2** Hidradenitis suppurativa patient with an inflamed nodule in the groin area at baseline (before treatment); following treatment with FLE, there is a significant reduction in inflammation (wk 6).

as per the recommended regime.<sup>7</sup> Briefly, a 2 mm layer of chromophore-containing gel was applied to the face and irradiated with a multi LED lamp (415 and 447 nm) (Kleresca<sup>®</sup>; FB Dermatology, Dublin, Ireland). Significant improvements were noted in the facial nodules and cysts during the treatment (week 2 and 4) at the 6-week time-point/the end of the treatment course (Figure 1). A further improvement in the accompanying facial erythema and the overall complexion of the skin was apparent 12 weeks from the initiation of treatment (Figure 1). Due to the association of AC with HS, here we also present comparable effects of FLE used off-label in an 18-year-old male HS

Hurley stage I patient (Figure 2). The patient received the same treatment as above. Again, we noted a reduction in inflammation and nodules (Figure 2). We also note a transient hyperpigmentation of the area, a known effect of the Kleresca<sup>®</sup> treatment.

### 3 | DISCUSSION

Both AC and HS are severe, debilitating, inflammatory skin conditions with limited treatment effectiveness. They often require systemic treatment options which are not always

effective or appropriate.<sup>4,8</sup> FLE is a noninvasive therapy that represents a novel induction of PBM with proven clinical efficacy in treating a range of inflammatory skin conditions.<sup>9</sup> FLE decreases inflammation and the associated lesions in acne vulgaris,<sup>7,10</sup> decreases the inflammatory erythematous reaction of rosacea subtypes 1, 2 and 3<sup>11</sup> and more recently, it has proven to be effective where other treatment efforts have failed; for example, in erlotinib-induced acneiform eruptions<sup>12</sup> and the difficult to treat granulomatous rosacea.<sup>13</sup> PBM-inducing devices are known to have antibacterial and anti-inflammatory effects.<sup>14</sup> While the mechanism of FLE in AC and HS remains to be elucidated, it is likely to be modulating the profound inflammatory response underpinning both conditions. In-vitro studies have shown, FLE decreases the inflammatory response of human epidermal keratinocytes and human dermal fibroblasts (HDFs) by reducing pro-inflammatory cytokine release; namely, tumor necrosis factor alpha (TNF- $\alpha$ ) and interleukin-6,<sup>6</sup> both of which play an essential role in regulating immune responses in many inflammatory diseases.<sup>15</sup> A specific role for TNF- $\alpha$  in AC and HS has been proposed. TNF- $\alpha$  is elevated in active lesions in HS<sup>3</sup> and TNF- $\alpha$  antagonists have yielded clinical improvement in AC.<sup>16</sup> It is apparent from both cases presented here that the general resolution of inflammation observed with FLE is having a beneficial effect in resolving the active lesions and associated redness in both conditions. Moreover, there is a significant improvement in the overall appearance of the skin. We have previously observed an increase in collagen production from HDF cells treated with FLE. It is likely the stimulation of collagen by FLE is also inducing a healing response, improving the appearance of scars and enhancing the overall texture of the skin.

## 4 | CONCLUSION

FLE effectively treated the inflammatory nodules and cysts common to both AC and HS. It also decreased the associated erythema and supported a healing response to improve the overall texture of the skin. FLE should be considered as a new treatment option for difficult to treat inflammatory skin conditions.

## CONFLICTS OF INTEREST

MCEN and DE are employees of FB Dermatology Ltd/ Kleresca®.

## AUTHOR CONTRIBUTIONS

IK, BR and PAG: study design; patient selection; clinical assessment; DE and MCEN: study design; drafting of the

original manuscript. All the authors listed have reviewed and approved the final version of the manuscript.

## CONSENT

Informed consent was acquired for both patients.

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