

Acne Treatment With 3-Step Broadband Light Protocol

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ABSTRACT

Background and objective: A new 3-step protocol using broadband light allows patients with moderate to severe inflammatory acne to avoid potential side effects of systemic acne treatments and the risks and uncertainties associated with laser and light treatments to date. The protocol also addresses acne scarring and, with appropriate modifications, all skin types.

Methods: The protocol consists of 6 to 8 treatments performed with a single device that allows the user to select wavelength, spot size, fluence, and pulse duration. Step 1 uses blue light with a large spot size and low fluence to kill *Propionibacterium acnes*. Step 2 features red and yellow light with a smaller spot size and higher fluence, which together exert anti-inflammatory effects and trigger neocollagenesis. Step 3 employs visible and infrared (IR) light with a high fluence and 12-second pulse length, delivered with a constant motion technique, to enhance previous results while also targeting areas of frequent breakouts.

Results: Challenging cases treated with the protocol include a young adult female with a nearly decade-long history of inflammatory and cystic acne. Her skin remained clear more than 6 months post-treatment. She reported her scarring reduction at 90%. Having treated more than 100 patients with the protocol, the author reports that approximately 80% of patients clear completely or achieve at least a 75% improvement in their inflammatory acne. Acne improvements start appearing 2 to 3 days after a treatment session. Red, purple, raised, or depressed acne scars less than 1 to 2 years old begin to fade 1 to 3 weeks post-treatment.

Conclusion: The 3-step protocol is safe and effective for patients with moderate to severe inflammatory acne and acne scarring.

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INTRODUCTION

Affecting an estimated 9.4% of the world's population,¹ acne remains the most common dermatological diagnosis. Systemic treatments such as isotretinoin and antibiotics can reduce the presence of moderate to severe acne, but these treatments can take several months to work and expose patients to unwanted risks and side effects that range from increased antibiotic resistance to potential teratogenicity.²

Lasers and light sources avoid such side effects, but using these treatments for acne can result in problems such as postinflammatory hyperpigmentation (PIH). Various authors have reported use of intense pulsed light (IPL) for acne, using a variety of treatment protocols, often involving topical aminolevulinic acid (ALA) as a photosensitizer, or concomitant use of other medical or procedural treatments that increase the regimen's complexity while obscuring the contribution of IPL. While many such reports highlight treatment successes,^{3,4,5} to date no standardized treatment regimen that clinicians can reliably reproduce has evolved. Reports commonly omit crucial details such as the treatment technique and number of pulses performed, as well as how treatment impacted one of acne's most distressing sequelae: acne scars.

This report introduces a novel 3-step regimen using a single broadband light device (BBL, Sciton). The device provides unprecedented flexibility in terms of indications and treatment parameters, and the ability to treat patients of all skin types safely.

METHODS

Step 1: After slipping the narrowband blue light filter into the device's handpiece, perform 3 passes over areas of active acne, such as the forehead, cheeks, neck, and upper back, using a large spot size (15 x 45 mm) and fairly low fluence (4 to 6 J/cm²), delivered for 240 to 300 ms (with skin types IV and V at the higher end of this spectrum) per pass. At these settings, a typical cheek undergoes 70 to 80 pulses (one pulse per second) total. As with blue light acne treatments using ALA, the blue light in Step 1 reacts with porphyrins naturally present in *P. acnes*, causing a photoreaction that kills these bacteria.^{6,7}

Step 2: Perform 2 to 3 sequential – not stacked – passes over areas of active acne and red or purple scars using yellow and red light (560 or 590 nm filter), with a smaller spot adapter (15 x 15 mm square or 11 mm circular), 15 J/cm² fluence, 15 ms pulse duration, and crystal cooling at 15°C. **Mechanism:** Step 2 appears to have a powerful anti-inflammatory effect on active lesions, while also causing areas of red and purple inflammation to begin dissipating in 1 to 2 days and red or purple scars to begin fading within 7 to 10 days. One to 3 weeks post-treatment, new collagen begins filling in areas of depressed scarring.

Step 3: Using a constant-motion application technique, move the handpiece back and forth over areas of active or frequent breakouts, using visible and infrared light (590-1,200 nm, aka the SkinTyte filter) at 8 to 15 W/cm² with a 12-second pulse

TABLE 1.

3-Step Acne Protocol

Step	Filter	Spot	Fluence	Pulses	Pulse Length	Cooling	Technique
1	NB blue (420-480 nm)	15 x 45 mm	4-6 J/cm ²	70-80, typical cheek	240-300 ms		3 passes over active acne
2	Red, yellow (560 or 590 nm)	15 x 15 mm square or 11 mm circular	15 J/cm ²	10-60 per cheek	15 ms	15°C	2-3 sequential passes over active lesions & scars
3	Visible, IR (590-1200 nm)	15 x 45 mm	8-15 W/cm ²	10-20 per cheek	12 seconds	30°C	Constant motion over active & potential breakout areas

duration (10 pulses total) and contact cooling at 30°C. Whereas patients with skin types V and VI have been excluded from IPL treatment due to safety concerns, performing Step 3 alone (using an 800 nm infrared cutoff filter) safely reduces such patients' acne and, less dramatically, PIH and raised or depressed acne scars. Safe parameters for skin types V and VI are 8 to 12 watts/cm², 12 seconds, and 30°C cooling, using the large spot and the constant motion technique. **Mechanism:** IR light alone has been shown to have beneficial effects in acne.⁸ The amount and duration of visible and IR light delivered in Step 3 appear to enhance results of Steps 1 and 2, which address current breakouts, while also treating areas prone to frequent breakouts (whether or not the patient has breakouts in these areas at the time of treatment).

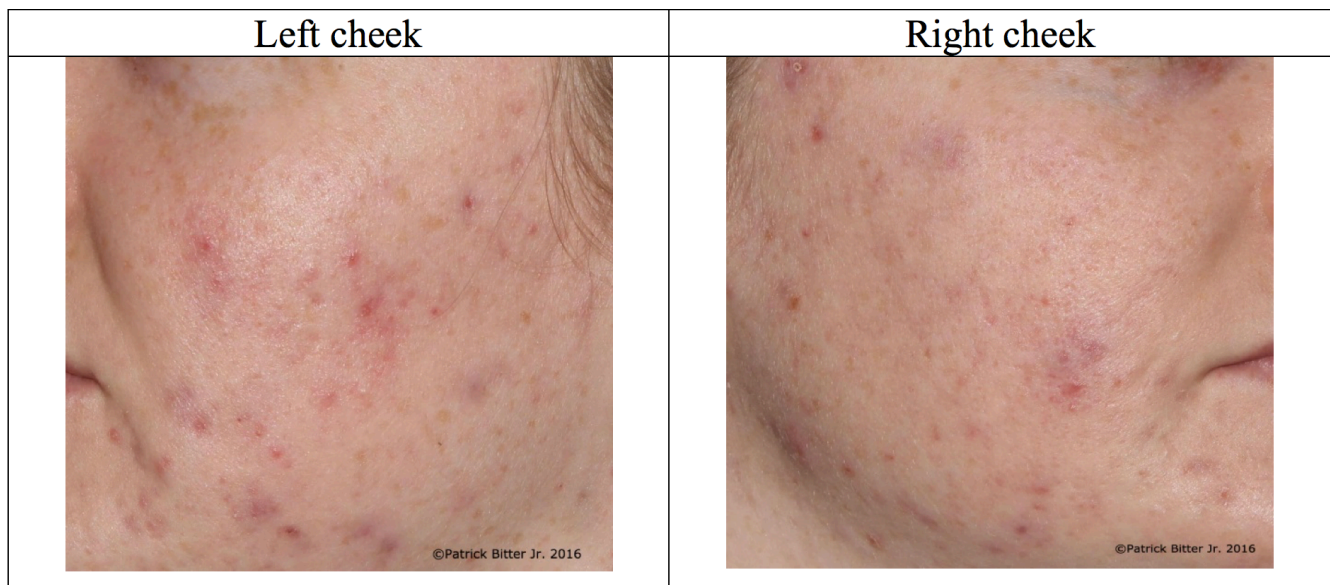
In preparation for treatment (and afterwards as well), patients must use sunscreen containing a physical sunblock such as titanium dioxide, particularly in summer, and avoid sun exposure. Tanned skin reacts differently to broadband light and is potentially more likely to incur superficial burns in Steps 1 and 2.

Although the treatment does not require topical anesthetic, sensitive patients may find it uncomfortable, particularly as fluence increases in Step 2. Patients may choose a combination of 23% lidocaine and 7% tetracaine (no more than 15 g total for all treatment areas), applied 30-minutes pretreatment and washed off immediately pretreatment. Serendipitously, this combination temporarily intensifies redness in lesions and scars, making them more visible treatment targets.

Including all 3 steps, a typical full-face treatment takes approximately 15 minutes. Treating the chest and back as well takes up to 30 minutes. Patients usually undergo a series of 6 to 8 treatments, spaced 2 weeks apart. Longer intervals between treatments appear to reduce the treatment's efficacy, necessitating additional treatments to reach the desired endpoint.

Patients experience no postprocedural pain or downtime. Whereas blue light treatment with ALA leaves patients' skin red for several days, areas treated with the 3 step protocol experience only slight erythema that resolves in 1 hour or less.

FIGURE 1. 21-year-old female pre-treatment (October 12, 2015).



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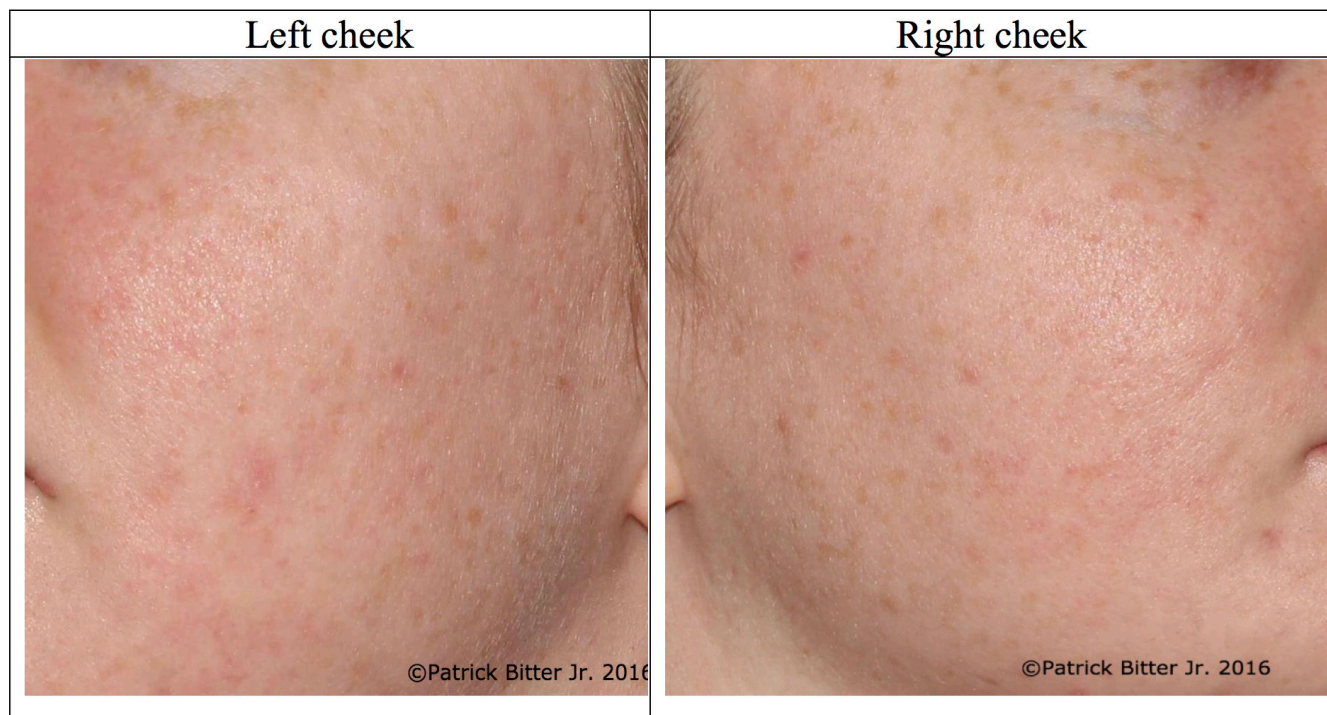
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FIGURE 2. 21-year-old female after 6 treatments (February 4, 2016).



FIGURE 3. 21-year-old female 6 months after 6 treatments (August 4, 2016).



RESULTS

Case 1

Over a 2- to 3-month period, the 3-step protocol virtually cleared the acne of a female patient in her early 20s who had had inflammatory

and cystic acne since age 13. She remained clear for more than 6 months post-treatment. This patient estimated that her acne scarring improved 90%, and it has continued to improve without further treatment. Oral isotretinoin would have been appropriate for this

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FIGURE 4. 21-year-old female pre-treatment (October 12, 2015).**FIGURE 5.** 21-year-old female after 6 treatments (February 4, 2016).

patient clinically, but she chose to avoid its risks and pregnancy prevention program. Moreover, oral isotretinoin typically takes 5 to 6 months to achieve full effect. The patient used a gentle cleanser and a zinc and titanium sunblock. No prescription oral or topical medications were used. The patient had used oral doxycycline 1 year earlier with modest improvement in inflammatory acne but no effect on extensive scarring.

Case 2

A female in her late 40s with type VI skin presented with moderate acne, PIH, and textural irregularities. One treatment (800 nm

SkinTyte filter, 8 to 12 W/cm², 12 second pulse, 20 pulses per side, 30°C cooling, and constant motion technique) resulted in reduced breakouts and slightly smoother skin texture 2 weeks later.

DISCUSSION

In the clinical experience of the author, who has treated more than 100 patients with the 3-step protocol, approximately 80% of patients achieve complete clearing or at least a 75% improvement in inflammatory acne, which begins improving 2 to 3 days after a full treatment cycle. Clearing tends to occur within 1 week of the first treatment. While the protocol has minimal

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FIGURE 6. 21-year-old female 6 months after 6 treatments (August 4, 2016).

impact on older acne scars, newer acne scars generally start improving in 1 to 3 weeks.

Improvements in inflammatory acne typically last up to 6 months without further treatments. Patients who eschew further treatments generally experience fewer inflammatory papules and little to no remaining cystic acne.

To maintain results, patients should repeat treatment (all 3 steps) every 1 to 3 months. Parameters for Steps 1 and 3 remain relatively constant. In Step 2, the fluence should be increased in subsequent treatments as the red and purple chromophores that the device targets begin to fade.

It remains unclear why 20% of patients achieve less than the typical 80% acne reduction. Such patients may have failed to undergo the full treatment cycle or waited too long between repeat treatments. Other possible explanations include overly conservative treatment parameters and/or the impact of a patient's individual hormonal milieu, which the treatment does not impact. Nevertheless, the author's experience shows that treatment always improves such patients' scars.

Treating the male beard area requires caution. As with any IPL treatments, certain parameters (such as those used in Step 2) can permanently reduce hair growth. To treat the beard or

mustache area safely, use smaller spot-size adapters for focal treatment of scars and active inflammatory lesions. Both Steps 1 and 2 are safe to perform in the beard without concern for hair loss.

The 3-step regimen evolved over the past 2 years, driven by the author's anecdotal observation that treating the entire face with multiple IPL passes for rejuvenation also appears to reduce – and in many cases completely clear – adult patients' inflammatory acne. Additionally, previous reports have established the utility of IPL for treating scars, especially recent red or purple, raised or depressed scarring.⁹

Previously available IPL and broadband devices offer similar wavelengths to those available in the BBL device, but the 3-step protocol is made possible by several design features unique to the BBL device:

Variable wavelengths – A total of 7 different filters allow wavelength selection to suit a variety of clinical applications; for example, 420 to 480 nm for acne, or 550 nm for pigmented lesions. In conjunction with each filter, the device's software facilitates manipulation of fluence, pulse duration, and integrated thermoelectric sapphire cooling to optimize results.

Multiple spot size adapters – The 15 x 45 mm spot size enables rapid treatment of larger areas such as the back.

FIGURE 7. Late 40s female before treatment.

Conversely, the 15 x 15 mm square or 11 x 11 mm circular spot allows for focal treatment of active breakouts or scarring, using higher intensities than would be desirable for the entire face.

Long pulse mode – Intervals lasting 10 to 15 seconds enable users to deliver significant quantities of visible and IR light quickly using the constant-motion technique (Step 3). Originally designed for skin tightening, this approach allows treatment of an entire back (with 10 to 20 pulses lasting 12 seconds each) in 2 to 4 minutes.

The 3-step protocol suits all types of inflammatory – and especially cystic – acne occurring anywhere on the face or body, and it works with or without topical treatments. The ideal patient has inflammatory acne, with or without cystic acne, and acne scarring that has developed over the past 1 to 2 years.

In the author's experience, most patients find the protocol more effective than oral antibiotics (which a recent meta-analysis showed to reduce inflammatory lesion counts 57.9%),¹⁰ and far more effective than traditional topical acne medications.

Furthermore, no oral or topical drugs currently address acne scarring effectively.

Because the protocol may be inappropriate for children too young to consent to or tolerate multiple treatments, the author reserves it for patients age 14 years and older. Also contraindicated are patients with tanned skin or unrealistic expectations. Practitioners must educate patients about the importance of committing to a full series of 3-step treatments, and that these treatments will not eradicate their acne indefinitely, but they generally provide highly satisfactory results that require ongoing maintenance. Relative contraindications include pregnancy and the use of photosensitizing drugs.

In summary, the 3-step protocol using broadband light allows patients to avoid the risks and requirements of oral acne treatments, offering rapid improvement, patient comfort, minimal risk, and no downtime.

DISCLOSURES

Dr. Bitter is a paid lecturer and instructor for Sciton but holds no equity in the company.

FIGURE 8. Late 40s female 2 weeks after treatment.**REFERENCES**

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