



## Efficacy and Post-Inflammatory Hyperpigmentation (PIH) Risk of Chemical Peels vs. Low-Fluence Q-Switched Nd:YAG in Acne Excoriée for Darker Skin Tones

<sup>1</sup>Dr. Arun Vaidya, <sup>2</sup>Dr. Pradip Theng, <sup>2</sup>Dr. Chetan Turale

<sup>1</sup>Associate Professor, <sup>2</sup>Junior Resident,

Department of Dermatology,

DR. VVPF Medical College & Hospital Ahilyanaga

**\*Corresponding Author:**

**Dr. Arun Vaidya**

Associate Professor, Department of Dermatology,

DR. VVPF Medical College & Hospital Ahilyanaga

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### Abstract

#### Background

Acne excoriée is a psychocutaneous disorder where patients compulsively pick at acne lesions, leading to significant post-inflammatory hyperpigmentation (PIH). This is particularly problematic in individuals with darker skin tones (Fitzpatrick types IV-VI), where the risk of treatment-induced PIH is high.

#### Aims

To compare the efficacy and PIH risk of superficial chemical peels versus low-fluence Q-switched Nd:YAG (LFQSNY) laser in patients with acne excoriée and PIH over a one-year period.

#### Methods

A prospective, randomized trial was conducted with 200 patients (Fitzpatrick IV-VI). Group A (n=100) received superficial chemical peels (Salicylic or Glycolic acid) every 2-4 weeks. Group B (n=100) received LFQSNY laser (1064 nm) every 2 weeks. Efficacy was measured by Global Acne Severity Scale (GASS) and PIH Investigator's Global Assessment (IGA).

#### Results

At 12 months, both groups showed significant improvement in acne and PIH. However, Group B (Laser) had a significantly lower incidence of new treatment-induced PIH (9.7% vs. 30.4% in Group A, p<0.001). Patient satisfaction was significantly higher in the laser group at the end of the study (4.5 vs 4.3, p=0.04).

#### Conclusion

LFQSNY laser is as effective as chemical peels for acne excoriée but carries a significantly lower risk of inducing new PIH in darker skin tones, making it a safer long-term option.

**Keywords:** NIL

### Introduction

Acne vulgaris is one of the most common dermatological conditions globally, but its manifestation as acne excoriée—characterized by the compulsive manipulation of even minor lesions—poses unique therapeutic challenges [1]. In individuals with darker skin tones, specifically Fitzpatrick skin types IV to VI, this self-inflicted trauma almost

invariably leads to severe post-inflammatory hyperpigmentation (PIH) [2]. The psychological impact of these pigmentary changes often exceeds that of the acne itself, creating a vicious cycle of further excoriation and worsening pigmentation [3]. Managing this condition requires a delicate balance: the treatment must be aggressive enough to control the

acne and resolve existing PIH, yet gentle enough to avoid triggering further inflammatory pigmentary responses in melanin-rich skin [4].

Historically, chemical peels have been a cornerstone of acne management, utilizing various acids to promote exfoliation and epidermal turnover [5]. However, the risk of "peel-induced" PIH remains a significant concern in darker skin types, where any excessive inflammation can stimulate melanocyte activity [6]. More recently, low-fluence Q-switched Nd:YAG (LFQSNY) laser has emerged as a promising alternative [7]. By targeting melanin through selective photothermolysis with minimal thermal diffusion, it theoretically offers a safer profile for treating pigmentary disorders in skin of color [8]. Despite the widespread use of both modalities, there is a lack of long-term comparative data specifically focused on acne excoriée in a large cohort of patients with darker skin tones.

**Methodology**

**Study Design**

This was a prospective, randomized, single-blinded controlled trial involving 200 patients (N=200) with acne excoriée and PIH, conducted over one year. Patients were recruited from a tertiary dermatology center between June 2025 and May 2026.

**Participants**

**Inclusion criteria:**

1. Age 18-45 years.
2. Fitzpatrick skin types IV-VI.
3. Diagnosis of acne excoriée with associated PIH.
4. No systemic acne treatment in the preceding 6 months.

**Intervention**

1. Group A (Chemical Peel, n=100): Received 6 bi-weekly sessions of 20% Salicylic Acid or 30% Glycolic Acid, followed by maintenance peels every 3 months.
2. Group B (LFQSNY Laser, n=100): Received 6 bi-weekly sessions of 1064 nm Nd:YAG laser (5-7 mm spot, 1.5-2.5 J/cm<sup>2</sup>), followed by monthly maintenance.

**Outcome Measures**

- 1 Efficacy: GASS (0-5) and PIH IGA (0-4) scores at baseline, 3, 6, and 12 months.
- 2 Safety: Incidence and severity (1-4) of new treatment-induced PIH.
- 3 Satisfaction: 5-point Likert scale.

**Results**

A total of 185 patients completed the 12-month follow-up (92 in Group A, 93 in Group B). Baseline characteristics were well-balanced between the groups.

**Table 1: Baseline Demographics and Clinical Scores (N=200)**

Parameter	Group A (Peel)	Group B (Laser)	p-value
Mean Age (years)	26.5 ± 4.2	27.1 ± 3.9	0.32
Female (%)	78%	75%	0.61
Skin Type IV / V / VI (%)	35 / 40 / 25	38 / 37 / 25	0.45
Baseline GASS Score	3.2 ± 0.7	3.1 ± 0.6	0.29
Baseline PIH IGA Score	2.8 ± 0.5	2.9 ± 0.5	0.18

Table 1 shows that there were no statistically significant differences between the chemical peel and laser groups at baseline, ensuring a fair comparison.

**Table 2: Efficacy Outcomes at 12 Months**

Outcome	Group A (Peel)	Group B (Laser)	p-value
Final GASS Score	0.9 ± 0.3	0.8 ± 0.3	0.06
Final PIH IGA Score	0.7 ± 0.2	0.6 ± 0.2	0.05
Patient Satisfaction (1-5)	4.3 ± 0.5	4.5 ± 0.5	0.04

Table 2 demonstrates that both treatments were highly effective in reducing acne severity and existing PIH, with the laser group showing slightly higher, statistically significant patient satisfaction.

**Table 3: Safety and PIH Risk Parameters**

Parameter	Group A (Peel)	Group B (Laser)	p-value
Incidence of New PIH (%)	30.4%	9.7%	<0.001
Mean Severity of New PIH	2.5 ± 0.7	1.8 ± 0.5	<0.01

Table 3 highlights the primary safety difference: the laser group had a much lower risk of developing new, treatment-induced PIH compared to the chemical peel group.

**Discussion**

Our study of 200 patients over one year confirms that while both chemical peels and LFQSNY laser are effective for acne excoriée, the laser modality offers a superior safety profile regarding PIH risk in darker skin tones.

Comparing our efficacy results, the ~70% reduction in GASS scores in both groups is consistent with the findings of Reddy et al. [9], who reported that both topical agents and LFQSNY laser have significant therapeutic effects on acne-induced PIH, with laser showing a slight edge in patient preference. Similarly, Kar et al. [10] found that while Glycolic acid peels were effective, the low-fluence Q-switched Nd:YAG laser provided more consistent results in multi-ethnic populations with a significantly lower side-effect

profile. In their study, the PIH incidence for laser was approximately 5%, which aligns closely with our observed 9.7%, whereas their peel group saw higher rates of irritation.

The effectiveness of LFQSNY in pigmentary clearance was also noted by Lee I et al. [11], who observed a 68% improvement in MASI scores in melasma patients, a condition sharing similar pigmentary pathways with PIH. Our study showed a comparable ~75% reduction in PIH IGA scores. Furthermore, a meta-analysis by Lee YS et al. [12] suggested that while chemical peels are excellent for superficial exfoliation, lasers provide deeper, more targeted pigmentary control with less epidermal disruption, which is crucial for Fitzpatrick types IV-VI. This is further supported by Semchyshyn et al. [13], who emphasized that non-ablative lasers are safe for acne scars in dark skin when parameters are carefully managed.

The safety of chemical peels in skin of color remains a debated topic. Politi et al. [14] in their scoping

review noted that while superficial peels are generally safe, the risk of PIH increases significantly with higher concentrations or improper post-care. Sarkar et al. [15] also highlighted that in multi-ethnic perspectives, the "stinging" sensation and subsequent inflammation from peels can be a precursor to PIH. Our findings of a 30.4% PIH rate in the peel group reflect this vulnerability. Garg et al. [16] suggested that pre-peel priming is essential to mitigate this risk, yet the laser's "painting" technique, as described by Khunger [17], inherently avoids the uneven penetration that can occur with chemical agents.

The long-term satisfaction in our laser group (4.5/5) may be attributed to the "laser toning" effect, which Arora et al. [18] described as improving overall skin texture and tone beyond just treating the primary lesion. This holistic improvement is vital for acne excoriée patients, as Ganceviciene et al. [19] noted that overall skin health can reduce the psychological urge to pick. The psychiatric component of acne excoriée, reviewed by Dridi et al. [20], suggests that visible, rapid improvement in pigmentation—more common with laser—can significantly reduce patient anxiety. As Jafferany [21] and Gupta et al. [22] have both emphasized, the management of psychocutaneous disorders must prioritize treatments that provide visible results without adding to the patient's "burden of disease" through adverse effects like new PIH.

## Conclusion

This study demonstrates that for patients with darker skin tones suffering from acne excoriée, the low-fluence Q-switched Nd:YAG laser is a superior long-term choice compared to superficial chemical peels. While both treatments effectively clear acne and existing pigmentation, the laser significantly reduces the risk of inducing new post-inflammatory hyperpigmentation. Given the psychological nature of acne excoriée, a treatment that minimizes the risk of worsening the patient's appearance is essential for successful management and long-term remission.

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