



## Clinical Effectiveness of a 1726-nm Laser for Acne Treatment in Asian Populations

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### Abstract

Acne vulgaris is a prevalent dermatologic disease that negatively affects a patients' quality of life. Although several treatment options are available, responses can vary, and some patients experience recurrence or adverse effects from treatment. A 1726-nm laser has been developed to selectively target sebaceous glands, play a key role in acne pathogenesis. However, there is limited clinical data on this technology's use in Asian populations. Thus, this study aims to evaluate the clinical effectiveness of a 1726-nm laser for mild-to-severe acne treatment in Thai patients. This prospective, single-arm clinical study enrolled 10 Thai patients with mild, moderate, and severe acne who received four sessions of 1726-nm laser therapy. Acne severity was assessed using acne lesion counts, categorized as inflammatory lesion counts (ILC) and non-inflammatory lesion counts (NILC), at baseline, during laser visits, and at follow-up. A progressive reduction in ILC was observed over the study period, with a statistically significant decrease noted at 4 weeks after the second laser session and sustained at the final follow-up ( $p < 0.05$ ). The mean percentage reduction in ILC at the final visit was 77.7% compared with baseline. NILC showed a downward trend, but this change did not reach statistical significance. Overall, treatment with this 1726-nm laser was associated with a significant improvement in inflammatory acne lesions. These findings suggest that laser therapy targeting sebaceous glands could be a promising non-pharmacologic option for acne management in Thai patients, warranting further investigation in larger controlled studies.

**Keywords:** *acne vulgaris, 1726-nm laser, sebaceous gland laser therapy, non-pharmacologic treatment, energy-based acne therapy, Asian patients*

### 1. Introduction

Acne vulgaris is one of the most prevalent dermatologic diseases, affecting individuals across a wide age range, particularly adolescents and young adults (Bhate & Williams, 2021; Cruz et al., 2023; Masterson, 2018; Del Rosso & Kircik, 2023; Stamu-O'Brien et al., 2020). Beyond its physical manifestations, acne can have a considerable psychosocial impact (Bhate & Williams, 2021; Cruz et al., 2023; Pakornphadungsit et al., 2023; Stamu-O'Brien et al., 2020). Clinically, acne can present as comedonal lesions, papules, or pustules, and may progress to nodulocystic lesions in more severe cases (Eichenfield et al., 2021; Masterson, 2018). Acne is a multifactorial disease that results from the interaction of several mechanisms, including increased sebaceous gland activity, follicular obstruction, microbial colonization, and inflammation. Because of this multifactorial pathogenesis, achieving sustained disease control remains challenging (Cruz et al., 2023; Jaalouk et al., 2024; Del Rosso & Kircik, 2023).

Current acne treatments mainly include topical therapies, systemic antibiotics, hormonal therapies, and oral isotretinoin. While these methods are widely used, clinical responses can vary. Long-term use may be associated with adverse effects, relapse after treatment discontinuation, or poor patient adherence. In addition, concerns about antibiotic resistance have led to increasing interest in non-antibiotic treatment options (Goldberg et al., 2023; Li et al., 2021). These issues highlight the need for alternative methods that directly target key pathogenic mechanisms of acne (Li et al., 2021).

Recently, light- and laser-based therapies have been introduced as adjunctive or alternative options for acne treatment (Li et al., 2021). Sebaceous glands play a central role in acne pathogenesis, making them an attractive therapeutic target. The 1726-nm laser was developed to selectively target lipid-rich sebaceous glands based on the principle of selective photothermolysis, as this wavelength corresponds to a peak absorption of lipids, which is abundant in sebaceous glands. This results in preferential thermal injury to sebaceous glands while sparing the adjacent epidermal and dermal structures. Previous studies suggest that



this wavelength may reduce sebaceous gland activity and improve acne severity while minimizing damage to surrounding tissues (Ważniewicz et al., 2025; Goldberg et al., 2023). However, clinical evidence remains limited, especially in Asian populations, where differences in skin characteristics and post-treatment responses may affect treatment outcomes. Asian individuals with darker skin types, particularly Thai patients who commonly have Fitzpatrick skin types III–IV, are more prone to post-inflammatory hyperpigmentation (PIH) following cutaneous inflammation or laser-based interventions. (Eimpunth, et al., 2013; Kligman & Shelley, 1958; Pappas et al., 2013; Perkins et al., 2011; Rawlings, 2006; Silpa-archa et al., 2017).

Therefore, this study aims to evaluate the clinical effectiveness of the 1726- nm laser is for acne treatment in Thai patients. The study focuses on changes in inflammatory and non-inflammatory lesion counts following treatment.

## 2. Objectives

The primary objective was to assess the clinical effectiveness of the 1726- nm laser in reducing inflammatory lesion counts among Thai patients with mild, moderate, or severe acne.

The secondary objectives were to assess changes in non-inflammatory lesion counts and to evaluate the safety of this treatment.

## 3. Materials and methods

### 3.1 Study design

This study was a prospective, single-arm study that included 10 Thai patients aged 20–35 years with mild, moderate, or severe acne, as diagnosed using the Investigator’s Global Assessment (IGA). All participants received four sessions of 1726- nm laser treatment. Acne severity was assessed using inflammatory and non-inflammatory lesion counts before and after treatment. Participants were instructed to maintain their usual skincare routines and to avoid any medical acne treatments during the study. Exclusion criteria included current or recent use of topical or systemic acne medications, defined as use of topical acne medications within 2 weeks, systemic antibiotics within 4 weeks, or oral isotretinoin within 6 months prior to enrollment. Additional exclusion criteria included pregnancy or breastfeeding, active skin infection at the treatment site, and any medical condition that might interfere with treatment assessment. This study was reviewed and approved by the Human Research Ethics Committee of Thammasat University (Medicine), with approval number MTU-EC-OO-0-176/68. All participants provided written informed consent prior to enrollment.

### 3.2 Research device

This study used a 1726- nm laser device (Accure Laser; Accure Acne Inc.) (Figure 1), an FDA-approved multi-pulse Raman fiber laser developed for the selective targeting of sebaceous glands. The device delivers laser energy up to 40 W with pulse durations of 100–150 milliseconds through a uniform square beam ( $4.7 \times 4.7 \text{ mm}^2$ ).

The system integrated an air-based skin-cooling mechanism and a thermal imaging camera for continuous real-time monitoring of epidermal temperature. Air cooling was chosen for its consistent thermal performance and safety. A standardized pre-cooling phase was conducted before treatment to ensure adequate skin protection.

Laser delivery followed a treat-to-temperature strategy, in which energy was adjusted based on real-time thermal feedback. Laser emission was initiated only after the pre-cooled skin temperature reached the predefined target level ( $-1^\circ\text{C}$ ). The device incorporated a safety mechanism that prevents laser emission if the target pre-cooling temperature is not achieved. Once initiated, laser pulses were delivered with continuous real-time thermal monitoring of the skin until the defined peak epidermal temperature was achieved, typically between  $40^\circ\text{C}$  and  $46^\circ\text{C}$  depending on the treatment area.

### 3.3 Study protocol

Participants who met the eligibility criteria received four sessions of 1726- nm laser treatment at 1-month intervals at Benchakitti Park Hospital. Acne lesion counts were recorded at baseline, prior to each laser session, and one month after completion of the laser course, based on in-person examinations under



standardized lighting. Standardized clinical photographs were taken using the same camera settings and patient positioning at each visit to ensure consistent documentation. Before each laser session, a topical anesthetic cream (10% lidocaine cream, LD cream) was applied to the face for 30 minutes to reduce discomfort. The use of any acne medications, including both topical agents and systemic therapies, was strictly prohibited throughout the study period.

### 3.4 Outcome assessment

Study outcomes were assessed by tracking changes in acne lesion counts throughout of the study. At every visit, a physician performed a direct facial examination under consistent lighting conditions and recorded the number of acne lesions. Lesions were classified as inflammatory (papules, pustules, and nodulocystic lesions) or non-inflammatory (comedonal lesions). These assessments were conducted at baseline, before each laser session, and at the scheduled follow-up.

### 3.5 Statistical analysis

Descriptive statistics were used to summarize the baseline characteristics data. Appropriate statistical tests were selected based on the data distribution. Changes in inflammatory and non-inflammatory acne lesion counts pre - and post - treatment were evaluated using paired t-test for data with a normal distribution, while the Wilcoxon signed-rank test was applied for non-normally distributed variables. All statistical analyses were performed using SPSS, and a p-value of less than 0.05 was considered statistically significant.



**Figure 1** The 1726- nm laser device (Accure Laser; Accure Acne Inc.)

## 4. Results and Discussion

### 4.1 Results

A total of 10 participants were enrolled, with equal representation of males and females (5 males and 5 females). The mean age of the participants was  $28.3 \pm 2.2$  years, ranging from 24 to 33 years. At baseline, four participants (40.0%) were classified as having mild acne, three (30.0%) had moderate acne, and three (30.0%) had severe acne. The baseline characteristics of the enrolled subjects are summarized in Table 1. All participants attended every scheduled treatment session and follow-up visit, and no participants were withdrawn from the study.

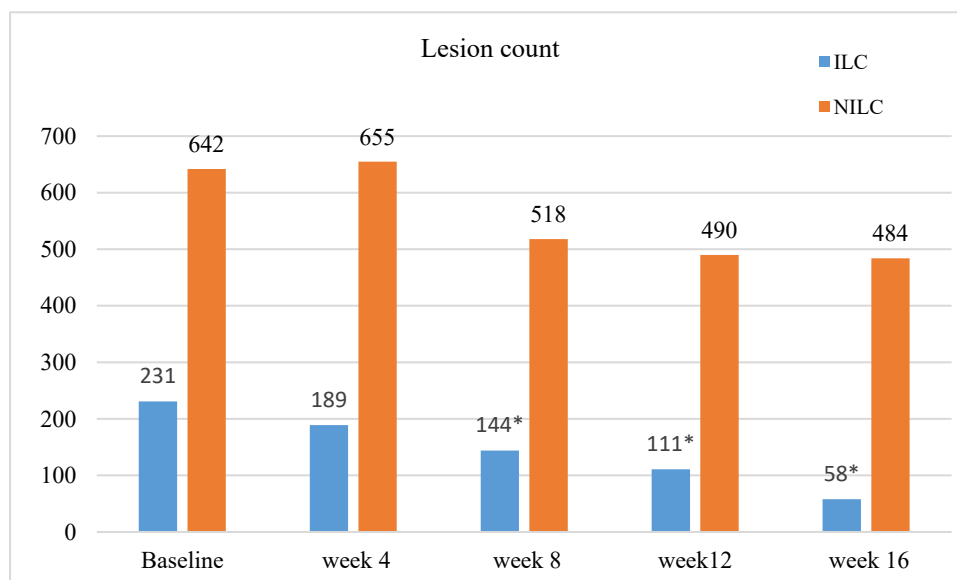
**Table 1** Baseline characteristics of enrolled subjects

Characteristics		Value (n = 10)
Sex, n (%)	Male	5 (50.0%)
	Female	5 (50.0%)
Age (years)	Mean $\pm$ SD	28.3 $\pm$ 2.2
	Min - Max	24 - 33
Acne grading, n (%)	Mild	4 (40.0%)
	Moderate	3 (30.0%)
	Severe	3 (30.0%)

Before treatment, the mean number of inflammatory lesions per patient was  $23.1 \pm 16.5$ , with a range of 6 to 65 lesions. Changes in inflammatory lesion counts (ILC) over the study period are summarized in Figure 2. Clinical photos are shown in Figure 3. A progressive reduction in inflammatory lesions was observed throughout the study. Although some participants showed only minimal improvement during the early treatment visits, a statistically significant decrease in ILC was observed at four weeks after the second laser session (week 8) compared to baseline when analyzed individually ( $p = 0.029$ ).

At the final follow-up visit, conducted four weeks after completion of the treatment course (week 16), ILC values were further reduced and remained significantly lower than baseline values. The mean number of inflammatory lesions per patient decreased to  $5.8 \pm 5.8$ , with a range of 0 to 15 lesions. Individual-level analysis confirmed a statistically significant reduction in ILC at the final assessment using the Wilcoxon signed-rank test ( $p = 0.005$ ). The mean percentage reduction from baseline at week 16, calculated at the individual-participant level, was 77.7%, with individual percentage reductions ranging from 44.0% to 100.0%, as shown in Table 2, indicating substantial clinical improvement.

Non-inflammatory lesion counts (NILC) were assessed at baseline and during follow-up visits, as shown in Figure 2. A downward trend in NILC was observed throughout the study, with a mean percentage reduction of 15.8%. However, this reduction did not reach statistical significance at the final follow-up compared with baseline based on individual-level paired analysis ( $p > 0.05$ ).



\* Statistically significant at P-value less than 0.05 compared to baseline

**Figure 2** Changes in aggregated inflammatory and non-inflammatory acne lesion counts over the study period



**Table 2** Individual percentage reduction in inflammatory lesion counts (ILC) and non-inflammatory lesion counts (NILC) at week 16 compared with baseline

Subject	% Reduction of ILC	% Reduction of NILC
1	52.2	-11.1
2	100.0	0.0
3	44.0	24.6
4	50.0	57.8
5	75.0	5.9
6	78.6	6.9
7	92.9	25.0
8	89.2	31.0
9	100.0	70.0
10	95.0	-52.0

#### 4.2 Discussion

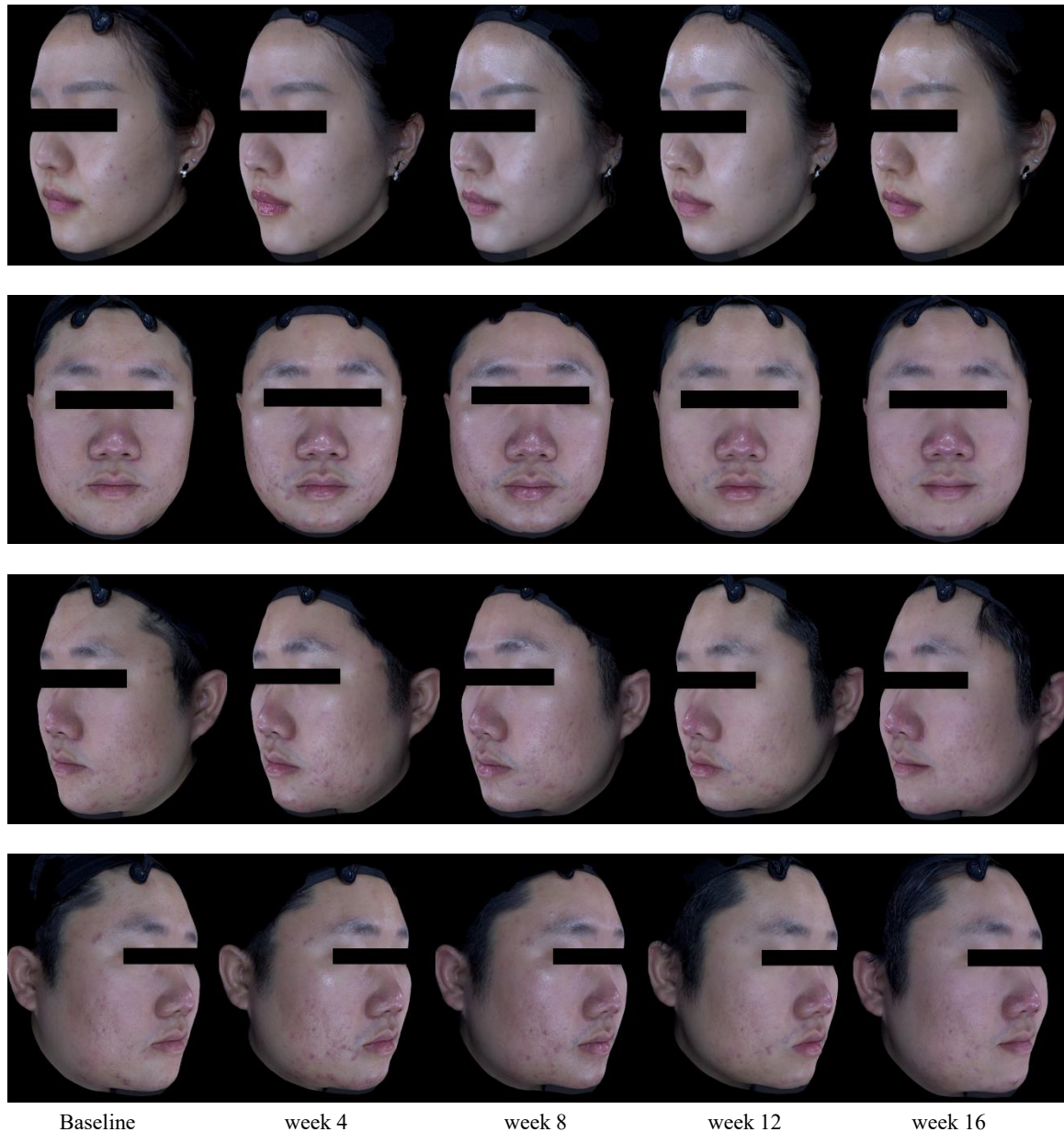
This study demonstrates that treatment with a 1726- nm laser significantly reduced inflammatory acne lesions in Thai patients. A decrease in inflammatory lesion counts was noted throughout the study, with statistical significance evident as early as four weeks after the second laser session and continuing through the final follow-up visit. These findings suggest that the 1726- nm laser may have a relatively early therapeutic effect on inflammatory acne lesions, even before the full treatment course is completed.

The early and sustained reduction in inflammatory lesions observed in this study aligns with the proposed mechanism of action of the 1726- nm wavelength, which selectively targets sebaceous glands. By delivering thermal energy primarily to sebaceous glands while sparing surrounding tissue, this laser system is thought to reduce sebaceous gland activity and subsequent inflammation, a key factor in inflammatory acne. The significant improvement in inflammatory lesions supports the concept that directly targeting sebaceous glands could be an effective non-pharmacologic approach for the inflammatory acne management.

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In contrast, although non-inflammatory lesion counts showed a downward trend over time, this reduction did not reach statistical significance. This finding may reflect fundamental differences between the pathogenesis of inflammatory and non-inflammatory acne lesions. Comedonal acne is primarily related to follicular hyperkeratinization, which may be less directly affected by sebaceous gland-targeted thermal injury. Additionally, the small sample size may have reduced the statistical power to detect minor changes in non-inflammatory lesions. Longer follow-up periods or larger study populations may be necessary to better evaluate the effect of the 1726- nm laser on non-inflammatory acne.

With regard to safety, the treatment was well tolerated by all participants. Mild transient erythema was observed immediately following laser application and resolved spontaneously within a few hours. One participant experienced mild skin dryness after treatment, and another reported mild itching in the treated area; both events were transient and resolved spontaneously. No cases of post-inflammatory hyperpigmentation, blistering, scarring, or infection were observed. No treatment-related downtime was reported. These findings are particularly relevant in Asian populations, including Thai patients, who often have darker Fitzpatrick skin phototypes and are therefore at increased risk of pigmentary complications following laser procedures. The absence of significant pigmentary adverse effects in this study supports the safety profile of the 1726- nm laser in this population.



**Figure 3** Clinical photos of two patients with different acne severities at baseline, week 4, week 8, week 12 (end of treatment), and week 16 (1 month post-treatment) following 1726- nm laser treatment

Oral isotretinoin remains the gold standard for moderate-to-severe acne due to its ability to reduce sebaceous gland activity and sebum production. However, its use is limited by potential systemic adverse effects, teratogenic risk, and the need for laboratory monitoring. Other commonly used treatments, including topical agents such as retinoids, benzoyl peroxide, and topical antibiotics, as well as systemic antibiotics, are effective for many patients but may require prolonged use and are associated with challenges such as skin irritation, variable adherence, and the development of antibiotic resistance. In contrast, the 1726- nm laser provides a localized treatment approach that selectively targets sebaceous glands without systemic exposure or the risks associated with long-term antibiotic use. The substantial reduction in inflammatory lesions observed in this study suggests that this modality may serve as a useful alternative or adjunctive treatment

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option, particularly for patients who are unable to tolerate systemic therapy, have contraindications to isotretinoin, have an inadequate response to conventional treatments, or prefer non-pharmacologic interventions. It may also be useful in patients with isotretinoin-resistant or recurrent acne.

The findings of this study are consistent with previous reports evaluating the clinical efficacy of the 1726-nm laser. In 2023, Goldberg et al. (2023) reported a statistically significant reduction in inflammatory lesion counts, with decreases of approximately 52 to 56% observed between four- and twelve-weeks following treatment compared with baseline ( $p = 0.003$ ) (Goldberg et al., 2023). Similarly, in 2025, Tanghetti et al. demonstrated progressive and statistically significant reductions in inflammatory and total lesion counts on the treated side ( $p < 0.0001$ ), while reductions in non-inflammatory lesion counts were not statistically significant ( $p > 0.05$ ). The study also reported an average reduction of 71% in inflammatory lesion counts at three months post-treatment (Tanghetti et al., 2025), which is comparable to the 77.7% reduction observed in the present study. These findings further support the effectiveness of the 1726-nm laser in selectively targeting sebaceous glands through lipid-specific absorption.

The findings of this study should be interpreted in light of several limitations. The relatively small sample size limits the generalizability of the results and may reduce the ability to detect statistically significant changes in outcomes. In addition, the relatively short duration of the follow-up period may not fully capture the long-term efficacy or durability of treatment effects, including the potential for relapse after treatment cessation. Moreover, while lesion counts served as the primary outcome measure, they did not address other important aspects of acne severity, such as sebaceous gland morphology or patient-reported outcomes. Future randomized controlled studies with larger sample sizes, longer follow-up periods, and additional outcome measures are necessary to further define the role of the 1726-nm laser in acne management.

Despite these limitations, this study provides preliminary evidence supporting the effectiveness of 1726-nm laser in reducing inflammatory acne lesions in an Asian population. The observed early onset of improvement and sustained reduction at follow-up suggest that this modality may be a promising adjunctive or alternative to conventional inflammatory acne therapies, particularly for patients who are unable or unwilling to use long-term medications.

## 5. Conclusion

This study demonstrated that a 1726-nm laser was significantly associated with a clinical reduction in inflammatory acne lesion counts among Thai patients. Gradual improvement was observed over the course of treatment and persisted at follow-up. In contrast, although non-inflammatory lesions showed a decreasing trend, the reduction was not statistically significant. These findings support the potential of the 1726-nm laser as a sebaceous gland-targeted, non-pharmacologic treatment option for inflammatory acne. Further studies with larger sample sizes and controlled study designs are suggested to confirm its effectiveness and better define its role in acne management.

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