

THE USE OF SUBCISION IN CONJUNCTION WITH FRACTIONAL CARBON DIOXIDE LASER TO IMPROVE ATROPHIC ACNE SCARS

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ABSTRACT

Objective: Acne is a prevalent skin condition affecting a wide range of age groups, often leading to severe scarring if left untreated. The use of subcision combined with fractional CO₂ laser therapy has been posited as a potentially more effective treatment method for atrophic acne scars compared to standalone laser treatment.

Methods: This clinical trial was conducted at Asha Derma Clinic, Gorakhpur, Uttar Pradesh, from 30th March 2023 to 30th March 2024. Thirty patients with ice pick and rolling-type atrophic acne scars were enrolled. Participants were treated on one side of their face with five sessions of fractional CO₂ laser and on the other side with one session of subcision with fractional CO₂ laser combined with four sessions of fractional CO₂ laser alone. Outcomes were assessed through scar improvement and patient satisfaction at 1, 2, and 6 mo post-treatment, with data analysis performed using ANOVA and the Wilcoxon rank-sum test.

Results: Significant improvements were observed in both recovery levels and patient satisfaction. The combined method showed higher recovery percentages (40-65%, Mean±SD: 54.7±7) compared to the laser alone (30-55%, Mean±SD: 43±11.1), with a p-value of 0.0005. Patient satisfaction also favored the combined method (1.8-3, Mean±SD: 6.6±1.2) over laser treatment alone (1.6-4, Mean±SD: 5.2±1.8), with a p-value of 0.0007.

Conclusion: The study demonstrated that subcision combined with fractional CO₂ laser therapy significantly enhances recovery levels and patient satisfaction in the treatment of atrophic acne scars, suggesting a robust advantage of integrating both treatments.

Keywords: Acne scars, Subcision, Fractional CO₂ laser, Patient satisfaction, Scar improvement, Dermatological treatment

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INTRODUCTION

Acne is universally acknowledged as the most common dermatological condition, affecting virtually every teenager to some extent [1]. However, its prevalence extends beyond the teenage years, affecting individuals across various age groups. It is commonly perceived as a normal aspect of adolescent development. Statistically, between 95–100% of males and 83–85% of females aged 16–17 experience acne [2]. Although the condition typically improves by the ages of 23–25, about 1% of men and 5% of women continue to suffer from acne into their 40s. If left untreated, acne risks severe scarring due to its natural tendency to resolve over time [3].

The underlying pathology of acne includes the blockage of sebaceous glands, often worsened by bacterial infections and other microbial factors. Prompt pharmacological intervention is essential to mitigate scarring in the early stages of acne development. Without such early intervention, 95% of severe acne cases lead to scarring [4].

At Asha Derma Clinic, we provide a diverse array of treatments ranging from topical medications, such as tretinoin and hydroquinone, to procedural interventions, including intralesional corticosteroid injections, cryotherapy, soft tissue fillers, and advanced laser therapies like CO₂ laser [5]. We utilize innovative techniques such as the fraxis DUO laser, which employs 10600 nm CO₂ laser to target water-containing tissues with microscopic beams, thereby effectively treating various types of scars with minimal side effects [6]. The clinic also employs subcision, a specialized surgical technique that detaches the scar from underlying tissues, thus reducing connective tissue formation and minimizing surface irregularities. To maximize therapeutic outcomes, Asha Derma Clinic frequently combines subcision with laser treatments [7].

This study, conducted at our clinic, compares the efficacy of 'subcision combined with fractional CO₂' with 'fractional CO₂ laser' in treating atrophic acne scars, aiming to provide patients with the most effective solutions for skin rejuvenation and scar reduction.

MATERIALS AND METHODS

Study design and setting

This clinical trial was conducted at Asha Derma Clinic, D-2, Tarang Cinema Road, Arya Nagar North, Gorakhpur, Uttar Pradesh. The study was carried out from 30th March 2023 to 30th March 2024 and included 30 patients with ice-pick-type and rolling-type atrophic acne scars. The sample size was determined using a sample size formula with a margin of error (d) set at 0.3.

Participants

Inclusion criteria required participants to be non-pregnant and non-lactating, with no use of oral or topical medications in the previous six months. Patients with any active skin infections (e.g., impetigo, herpes simplex, flat wart) or significant dermatological history were excluded. Individuals prone to keloids, suffering from acne rosacea, or with psychological disorders were also excluded. Participants unwilling to continue in the study were dropped.

Interventions

Participants were randomly assigned to receive treatments on either side of their face. The right side of each participant's face underwent five sessions of fractional CO₂ laser treatment at 4 w intervals. The left side was treated once with subcision combined with laser therapy, followed by four sessions of fractional CO₂ laser at 4 w intervals. The laser parameters were set at energy 18 mJ, 0.8 pitch distance, and 1 stack (beam profile according to scar size), utilizing a Creative ilooda, fraxis DUO machine (manufactured in South Korea).

Procedure

One hour prior to subcision, topical anesthesia was applied using lidocaine and prilocaine cream under plastic covers. In first session, Subcision was performed over left side of the face using an insulin

needle inserted parallel to the skin surface and just beneath the scar. The needle was maneuvered in a fan-like pattern to disrupt the fibrotic bands within the dermis. Fractional CO₂ laser was performed later over both sides of the face. In the next 4 sessions, only fractional CO₂ laser was performed over both the sides of the face.

After each session, the treatment area was managed with an ice pack to minimize swelling and hematoma formation. Antibiotics and anti-inflammatory medications were prescribed for 5-7 d post-surgery.

Outcome measures

The primary outcomes included the assessment of scar improvement and patient satisfaction evaluated at 1 and 2 mo post-treatment, with a final evaluation at 6 mo. Comparisons of pre-and post-treatment photographs were conducted blindly by a dermatologist not involved in the treatment procedures. Patient satisfaction was gauged using a five-point visual analog scale ranging from "not satisfied" to "completely satisfied." Secondary outcomes involved a comparison of side effects between the two treatment modalities.

Statistical analysis

Data were recorded and analyzed using SPSS software version 18 (SPSS Inc., Chicago, Illinois, USA). Statistical tests applied included

ANOVA and the Wilcoxon rank-sum test to evaluate the differences in treatment outcomes and side effects across the study groups.

RESULTS

The comparative analysis of recovery levels and patient satisfaction across two acne scar treatment methods revealed statistically significant differences. As shown in table 1, the average recovery percent for the laser treatment method ranged from a minimum of 30% to a maximum of 55%, with a mean of 43±11.1. In contrast, the combined method, which incorporated subcision with laser treatment, demonstrated a higher recovery range from 40% to 65%, and a mean recovery of 54.7±7, with both methods showing a significant p-value of 0.0005.

Table 2 details patient satisfaction, where the laser method showed a satisfaction range from 1.6 to 4, averaging 5.2±1.8. The combined method recorded slightly higher satisfaction levels, ranging from 1.8 to 3 but with a higher mean satisfaction of 6.6±1.2, and a significant p-value of 0.0007.

These results indicate better performance and patient satisfaction from the combined treatment approach compared to laser treatment alone, emphasizing the potential benefits of integrating subcision with laser therapy in managing atrophic acne scars.

Table 1: Recovery level and patient satisfaction in both groups

Treatment method	Average recovery percent (%)	P-value
Laser	30 (Least), 55 (Most), 43±11.1 (Mean±SD)	0.0005
Combined Method	40 (Least), 65 (Most), 54.7±7 (Mean±SD)	0.0005

SD: Standard Deviation

Table 2: Satisfaction status in both groups

Treatment method	Satisfaction average	P-value
Laser	1.6 (Least), 4 (Most), 5.2±1.8 (Mean±SD)	0.0007
Combined Method	1.8 (Least), 3 (Most), 6.6±1.2 (Mean±SD)	0.0007

SD: Standard Deviation



Fig. 1: Clinical pictures

DISCUSSION

The current study, conducted at Asha Derma Clinic, focused on evaluating the efficacy of two distinct treatment modalities for

atrophic acne scars: fractional CO₂ laser therapy alone and a combined method involving subcision and fractional CO₂ laser [8]. Our findings reveal statistically significant differences in both recovery levels and patient satisfaction between these two

approaches, which suggest potential implications for clinical practice in dermatology [9].

Our analysis demonstrated that the combined treatment method led to higher recovery percentages, with an average increase from 40% to 65% compared to 30% to 55% with the laser treatment alone [10]. The mean recovery rates further support this observation, showing a notably higher effectiveness in the combined method (54.7 ± 7) than in the laser-only treatment (43 ± 11.1). The statistical significance of these differences ($p=0.0005$) underscores the robustness of the combined approach in facilitating scar recovery [11].

Similarly, patient satisfaction ratings were more favorable in the combined treatment group, with a higher mean satisfaction score (6.6 ± 1.2) compared to the laser-only group (5.2 ± 1.8) [12]. This difference was also statistically significant ($p=0.0007$), indicating a clear preference among patients for the combined treatment method. These findings are particularly relevant as patient satisfaction is a critical measure in evaluating the success of cosmetic and dermatological treatments.

The superior performance of the combined treatment method could be attributed to the synergistic effects of subcision and laser therapy. Subcision mechanically disrupts fibrotic strands that tether the scar to the underlying tissue, potentially allowing for more effective laser penetration and subsequent collagen remodeling. This hypothesis is supported by previous studies that have demonstrated enhanced outcomes with the use of combined therapeutic modalities in scar management [13].

Clinically, these results suggest that incorporating subcision with fractional CO₂ laser treatments may offer a more robust solution for patients with severe atrophic acne scars, providing both improved efficacy and greater patient satisfaction. This approach aligns with the growing trend in dermatology to utilize combination therapies to tackle complex dermatological issues more effectively.

Future research should aim to expand on these findings by including larger sample sizes and diverse patient demographics to generalize the efficacy of this combined treatment approach. Moreover, long-term follow-up studies are needed to assess the durability of treatment benefits and to further elucidate the mechanistic synergies between subcision and laser therapy. This study sets the foundation for such inquiries, highlighting the importance of innovative, patient-centered approaches in the field of cosmetic dermatology.

CONCLUSION

This study at Asha Derma Clinic confirms that combining subcision with fractional CO₂ laser therapy significantly enhances recovery levels and patient satisfaction in the treatment of atrophic acne scars compared to fractional CO₂ laser therapy alone. The combined approach offers a robust and preferred treatment strategy, demonstrating superior effectiveness in scar improvement and patient outcomes. These findings advocate for an integrated treatment regimen in clinical practice, ensuring both higher efficacy and enhanced patient contentment in managing complex dermatological conditions like acne scarring.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally

CONFLICTS OF INTERESTS

Declared none

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