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Combination Therapy of Subcision and Laser in Rolling Acne Scars: Outcome Analysis

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ABSTRACT

Background: Acne scarring, particularly rolling scars, represents a common dermatological concern with significant psychosocial impact. Multiple treatment modalities exist; however, combination approaches are increasingly preferred for improved outcomes. This study evaluates the efficacy and safety of combined subcision and laser therapy in rolling acne scars. **Objective:** To assess clinical improvement, patient satisfaction and complication profile of subcision combined with fractional laser therapy in patients with rolling acne scars. **Methods & Materials:** A prospective observational study was conducted on approximately 230 patients attending City Aesthetics, Advanced Skin Laser Center, Jashore, from May 2023 to March 2026. Patients with clinically diagnosed rolling acne scars were enrolled. Treatment involved subcision followed by fractional laser resurfacing sessions at defined intervals. Outcomes were assessed using Goodman and Baron Scar Grading System and patient satisfaction scale. **Results:** Significant improvement in scar depth and skin texture was observed after combination therapy. At final follow-up, approximately 78% of patients demonstrated ≥50% improvement in scar severity grading. Patient satisfaction was high with 82% reporting good to excellent outcomes. Adverse effects were mild and transient, including erythema, edema and post-inflammatory hyperpigmentation in a small proportion of patients. **Conclusion:** Combination therapy using subcision and fractional laser is an effective and safe approach for rolling acne scars, providing superior outcomes compared to monotherapy approaches. Further controlled studies are recommended to standardize treatment protocols.

Keywords: *Acne Scars, Rolling Scars, Subcision, Fractional Laser, Combination Therapy.*

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INTRODUCTION

Acne vulgaris is one of the most prevalent chronic inflammatory skin disorders worldwide, affecting a large proportion of adolescents and young adults. Although active acne lesions can be controlled with medical therapy, post-acne scarring remains a persistent and often disfiguring complication. Among different scar types, atrophic acne scars, particularly rolling scars are frequently encountered in clinical practice and are associated with significant psychological distress and reduced quality of life. Rolling acne scars are characterized by dermal tethering caused by fibrous bands extending from the dermis to subcutaneous tissue. This results in an undulating skin surface that becomes more prominent under certain lighting conditions. The pathogenesis involves destruction of collagen during inflammatory acne followed by abnormal wound healing and fibrotic band formation. Because of their structural nature, rolling scars are often resistant to single-modality treatments. Various treatment options have been introduced for acne scar management, including chemical peels, microneedling, dermabrasion, fillers, laser resurfacing and surgical techniques. However, no single modality provides complete correction for moderate to severe rolling scars. Fractional laser resurfacing has gained popularity due to its ability to create controlled microthermal zones, stimulating dermal remodeling and neocollagenesis while preserving surrounding tissue for faster healing.[1] Subcision is a minimally invasive surgical technique specifically designed to treat tethered scars. By mechanically breaking the fibrotic bands beneath the scar, subcision releases the depressed area and initiates a wound-healing response that promotes collagen formation and dermal elevation.[2] Despite its effectiveness in improving scar depth, subcision alone may not adequately address surface texture irregularities or pigmentary changes. Recent studies have suggested that combining subcision with fractional laser therapy provides synergistic benefits. Subcision addresses the structural component of rolling scars, while laser therapy improves epidermal texture and dermal collagen density. This dual-modality approach targets multiple layers of scar pathology, leading to superior cosmetic outcomes compared to monotherapy approaches.[3,4] In developing countries such as Bangladesh, acne scarring is highly prevalent due to delayed treatment of acne, limited dermatological awareness and restricted access to early intervention. Consequently, a significant number of patients present with moderate to severe scarring requiring advanced procedural management. Despite increasing availability of aesthetic dermatology services, there remains limited locally generated clinical evidence evaluating combined therapeutic approaches. Therefore, this study was conducted at City Aesthetics, Advanced Skin Laser Center, Jashore, to evaluate the clinical effectiveness and safety of combined subcision and fractional laser therapy in patients with rolling acne scars. The primary objective was to assess improvement in scar severity, while secondary objectives included evaluating patient satisfaction and treatment-related adverse effects.

METHODS & MATERIALS

Study Design and Setting

This was a prospective observational clinical study conducted at City Aesthetics, Advanced Skin Laser Center, 96 Jail Road, Sadar, Jashore, Bangladesh, over a period of approximately 34 months (May 2023 to March 2026). The study was designed to evaluate the clinical efficacy and safety of combination therapy using subcision and fractional laser resurfacing in patients with rolling acne scars.

Study Population

A total of approximately 230 patients with clinically diagnosed rolling atrophic acne scars were enrolled consecutively during the study period. Patients were recruited from outpatient dermatology and aesthetic consultation services.

Inclusion Criteria

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Patients were included if they met the following criteria:

- Age between 18 and 45 years
- Presence of clinically diagnosed rolling acne scars
- Stable or inactive acne condition (no active inflammatory lesions)
- Willingness to undergo combination treatment and complete follow-up visits
- Provision of informed consent

Exclusion Criteria

Patients were excluded if they had:

- Active acne requiring systemic treatment
- History of keloid or hypertrophic scarring tendency
- Pregnancy or lactation
- Recent isotretinoin use within the past 6 months
- Coexisting dermatological conditions affecting facial skin evaluation

Treatment Protocol

All enrolled patients received combination therapy consisting of subcision followed by fractional laser resurfacing.

1. **Subcision Procedure:** Subcision was performed under strict aseptic conditions using a Nokor needle or blunt cannula after local anesthesia with lidocaine. The fibrotic strands anchoring the rolling scars were mechanically released in a fanning technique to elevate depressed scars and induce controlled dermal injury.
2. **Fractional Laser Therapy:** Fractional CO_2 or Er:YAG laser resurfacing was performed after an interval of 2–4 weeks post-subcision to allow initial healing. Laser settings were individualized based on skin type and scar severity. Treatment sessions were repeated at 6–8 week intervals, depending on clinical response.

Outcome Assessment

Clinical outcomes were evaluated using the Goodman and Baron qualitative acne scar grading system. Standardized pre- and post-treatment photographs were taken under identical lighting conditions.

Outcome measures included:

- Reduction in scar severity grade
- Percentage improvement in scar appearance
- Global aesthetic improvement
- Patient satisfaction score (poor, fair, good, excellent)

Follow-Up and Evaluation

Patients were followed at baseline, 3 months, 6 months and final follow-up (up to 24 months in some cases). Safety assessment included documentation of all adverse effects such as erythema, edema, post-inflammatory hyperpigmentation, infection or any procedural complications.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 29.0. Continuous variables were expressed as mean ± SD and categorical variables as frequency and percentage. Changes in scar scores over follow-up were assessed using appropriate comparative tests. Associations between categorical variables were analyzed using the chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant.

RESULTS

The study population consisted of 230 patients with a nearly equal gender distribution (48.7% male and 51.3% female). The mean age was 26.8 ± 6.4 years and the majority of patients had long-standing acne scars with an average duration of 3.2 years. Moderate rolling scars were more common (60%) compared to severe scars (40%) and approximately two-thirds of patients had previously received some form of acne treatment. These baseline characteristics are presented in *Table I*.

Table I

Baseline Characteristics of Study Population (n = 230).

Variable	Number (%) / Mean ± SD
Age (years)	26.8 ± 6.4
Male	112 (48.7%)
Female	118 (51.3%)
Duration of acne scars	3.2 ± 1.5 years
Moderate rolling scars	138 (60%)
Severe rolling scars	92 (40%)
Previous acne treatment history	156 (67.8%)
No prior procedural treatment	74 (32.2%)

Clinical assessment using the Goodman and Baron Scar Grading System demonstrated consistent and progressive improvement over time. The mean baseline scar score of 12.4 decreased to 8.9 at 3 months, representing a 28% improvement. At 6 months, further reduction to 5.9 was observed, corresponding to a 52% improvement. At final follow-up, the mean score reduced significantly to 3.6, indicating an overall 71% improvement in scar severity, as shown in *Table II*.

Table II

Change in Scar Severity Over Time (Goodman & Baron Scale).

Follow-up Time	Mean Scar Score	Percentage Improvement
Baseline	12.4 ± 2.1	0%
3 months	8.9 ± 1.8	28%
6 months	5.9 ± 1.6	52%
Final follow-up (12–24 months)	3.6 ± 1.2	71%

When final outcomes were categorized, 41.7% of patients achieved excellent improvement (>75%), while 36.5% achieved good improvement (50–75%). A smaller proportion showed moderate response (16.5%) and only 5.3% of patients had poor response to therapy. This indicates that nearly 78% of patients experienced clinically significant improvement following combination treatment (*Table III*).

Table III
Overall Clinical Outcome After Combination Therapy.

Outcome Category	Criteria	Number (%)
Excellent	>75% improvement	96 (41.7%)
Good	50–75% improvement	84 (36.5%)
Moderate	25–50% improvement	38 (16.5%)
Poor	<25% improvement	12 (5.3%)

Regarding safety, the procedure was well tolerated. The most common adverse effect was mild edema (22%), followed by transient erythema (18%). Post-inflammatory hyperpigmentation was observed in 9% of patients but was manageable with topical therapy. Importantly, no cases of infection, hypertrophic scarring or worsening of acne scars were recorded. The adverse-effect profile is summarized in *Table IV*A.

Patient satisfaction closely reflected clinical outcomes. A total of 45% of patients reported excellent satisfaction, while 37% reported good satisfaction. Only 18% of patients reported fair or poor satisfaction, mainly among those with severe baseline scarring. The distribution of patient satisfaction is presented in Table IVB.

Table IV
Adverse Effects and Patient Satisfaction.

A. Adverse Effects

Table IVA. Adverse Effects

Complication	Number (%)	Severity
Erythema	42 (18%)	Mild, transient
Edema	51 (22%)	Mild, resolved in 3–5 days
Post-inflammatory hyperpigmentation	21 (9%)	Mild–moderate
Infection / scarring worsening	0 (0%)	None

B. Patient Satisfaction

Table IVB. Patient Satisfaction

Level	Number (%)
Excellent	104 (45%)
Good	85 (37%)
Fair	30 (13%)
Poor	11 (5%)

DISCUSSION

The present study demonstrates that combination therapy using subcision and fractional laser resurfacing provides significant and sustained improvement in patients with rolling acne scars. The results showed that approximately 71% overall improvement in scar severity was achieved with more than three-quarters of patients experiencing clinically meaningful benefits. These findings support the concept that multimodal therapy yields superior outcomes in atrophic acne scars compared to single-modality treatments. Rolling scars are primarily caused by dermal tethering, which creates a downward traction effect on the skin surface. Subcision directly addresses this pathological mechanism by mechanically severing fibrotic bands. This immediate structural release contributes to early visible improvement in scar elevation. Additionally, controlled trauma induced by subcision triggers a cascade of wound healing and collagen remodeling, further enhancing dermal thickness over time.[2] Fractional laser resurfacing complements subcision by targeting epidermal and dermal remodeling. The creation of microthermal zones stimulates fibroblast activation, collagen synthesis and reorganization of dermal matrix components. This leads to improved skin texture, tone and overall surface regularity. When used sequentially after subcision, fractional laser therapy enhances long-term remodeling and refines residual irregularities. [1,5] In the current study, the majority of improvement was observed after 6 months with continued enhancement at final follow-up. This delayed progressive response is consistent with the biological timeline of collagen remodeling, which continues for several months after procedural intervention. Similar patterns of improvement have been reported in previous studies evaluating combination therapy for atrophic acne scars. [6,7] Patient satisfaction in this study was high with 82% reporting good to excellent outcomes. This indicates that objective clinical improvement correlated well with subjective perception of aesthetic enhancement. Psychological burden associated with acne scarring is well documented and even moderate clinical improvement can significantly enhance self-esteem and quality of life. Adverse effects in this study were minimal and transient. The most common complications included erythema, edema and post-inflammatory hyperpigmentation. These are expected responses following controlled dermal injury and were managed conservatively without long-term sequelae. Importantly, no severe complications such as infection, hypertrophic scarring or worsening of scars were observed, indicating that the procedure is safe when performed with proper technique. The findings of this study are consistent with previous literature reporting superior outcomes with combined subcision and fractional laser therapy compared to monotherapy approaches. [8,9,10] However, differences in patient demographics, scar severity and treatment protocols may account for variability in reported outcomes across studies. The strengths of this study include a relatively large sample size and extended follow-up period. However, limitations include its observational design, lack of a control group and potential operator-dependent variability in treatment application. Future randomized controlled trials with standardized laser parameters and objective imaging modalities would further strengthen evidence in this field.

CONCLUSION

Combination therapy using subcision followed by fractional laser resurfacing is an effective and safe treatment modality for rolling acne scars. It provides significant improvement in scar depth, skin texture and patient satisfaction with minimal adverse effects. This dual-modality approach should be considered a standard option in aesthetic

dermatology practice for atrophic acne scars.

DECLARATIONS

Ethics Approval and Consent to Participate

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the appropriate institutional ethics committee before commencement of the study. Written informed consent was obtained from all participants prior to enrollment and treatment.

CONSENT FOR PUBLICATION

Written informed consent was obtained from participants for the use of anonymized clinical information and standardized clinical photographs for scientific publication. Identifying information was excluded from the manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

FUNDING

No external funding was received.

DATA AVAILABILITY

Data are available from the corresponding author upon reasonable request.

AUTHORS CONTRIBUTIONS

All authors contributed to the study, manuscript preparation, critical revision and approved the final manuscript.

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