Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Dermatology

Effectiveness of Sequential Facial Rejuvenation Treatments for Photoaging and Acne Scarring

Fahim Farzana Aishi[1*], Anamul Haque Milton[2]

[1]Consultant, Aesthetic Dermatology, Spring Hill Hospital Ltd, Faridpur, Bangladesh
[2]Consultant, Pain & Regenerative Medicine Specialist, General Hospital Ltd, Faridpur, Dhaka, Bangladesh

DOI: https://doi.org/10.36347/sjams.2025.v13i12.015 | **Received:** 18.10.2025 | **Accepted:** 29.12.2025 | **Published:** 30.12.2025

***Corresponding author:** Fahim Farzana Aishi
Consultant, Aesthetic Dermatology, Spring Hill Hospital Ltd, Faridpur, Bangladesh

Abstract **Original Research Article**

Background*:** Facial aging and atrophic acne scars significantly impact appearance and quality of life. Sequential multimodal facial rejuvenation treatments, combining microneedling, chemical peels, laser therapy, and adjunct interventions, may offer superior clinical outcomes compared to single-modality therapies. ***Objective*:** To evaluate the effectiveness, safety, and patient satisfaction of sequential facial rejuvenation treatments for improving photoaging and atrophic acne scars. ***Methods*:** This prospective interventional study enrolled 130 adults (70 females, 60 males; mean age 34.5 ± 8.2 years) with clinical signs of photoaging and atrophic acne scars at Spring Hill Hospital Ltd, Faridpur, from August 2024 to August 2025. Participants received sequential multimodal treatments, including microneedling, chemical peels, non-ablative laser therapy, and adjunctive interventions. Primary outcomes were changes in Glogau Wrinkle Scale and Goodman & Baron Acne Scar scores assessed at baseline and 12 weeks post-treatment. Secondary outcomes included patient satisfaction (5-point Likert scale) and treatment-related adverse effects. Data were analyzed using paired t-tests and descriptive statistics. ***Results: After 12 weeks, the mean Glogau Wrinkle Scale score decreased from 2.87 ± 0.68 to 1.72 ± 0.64, reflecting a 40.1% improvement. Goodman & Baron Acne Scar scores decreased from 18.5 ± 4.6 to 10.8 ± 3.9, a 41.6% improvement. Patient satisfaction was high, with 82.3% reporting satisfaction or high satisfaction. Adverse effects were mild and transient, including erythema (5.4%), mild edema (3.8%), and temporary hyperpigmentation (2.3%), with no severe events observed. ***Conclusion*:** Sequential facial rejuvenation treatments are effective, safe, and well-tolerated for managing photoaging and atrophic acne scars. These multimodal, staged interventions provide significant objective improvements and high patient satisfaction, supporting their clinical relevance for aesthetic dermatology.

Keywords: Sequential Facial Rejuvenation, Fitzpatrick Skin Type, Photoaging, Acne Scars, Patient Satisfaction.

INTRODUCTION

The desire for a youthful appearance has grown due to population aging and media influence. Facial rejuvenation addresses age-related changes, necessitating detailed knowledge of facial anatomy for effective outcomes [1]. Acne vulgaris is a chronic inflammatory disorder that frequently causes permanent scarring, with nearly half of patients affected; delayed treatment worsens scar severity and psychological impact [2]. Both photoaging and acne scarring negatively affect quality of life. UV-induced photoaging manifests as wrinkles, elastosis, and pigmentation changes, which respond better to combination therapies than single interventions [3]. Atrophic acne scars, resulting from abnormal dermal healing, are challenging to treat, but sequential multimodal approaches—including subcision, microneedling, and CROSS—show superior improvement and patient satisfaction compared with single treatments [4].

Globally, sequential or combination therapies have demonstrated efficacy. For photoaging, IPL followed by non-ablative fractional laser improves texture, pigmentation, and wrinkles via complementary dermal remodeling and neocollagenesis [5]. In acne scars, staged multimodal laser therapy combining ablative CO_2 and non-ablative 1570 nm lasers significantly reduces scar volume with high satisfaction and minimal adverse effects [6]. Comparative studies also suggest sequential approaches offer better recovery and satisfaction than single-modality treatments [7, 8]. Local evidence from Bangladesh supports these findings, showing meaningful scar improvement with radiofrequency microneedling or fractional CO_2 laser [9], consistent with global literature [10]. Based on this

evidence, the present study aimed to evaluate the effectiveness of sequential facial rejuvenation treatments in improving skin texture, wrinkle severity, acne scar reduction, and patient satisfaction in adults with photoaging and atrophic acne scars.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective interventional study conducted at Spring Hill Hospital Ltd, Faridpur from August 2024 to August 2025 to evaluate the effectiveness of sequential facial rejuvenation treatments for photoaging and atrophic acne scars.

Study Population

A total of 130 adult participants (both males and females) with clinical signs of photoaging and atrophic acne scars were enrolled.

Inclusion Criteria: Age 18–60 years, Fitzpatrick skin types I–VI, willingness to participate.

Exclusion Criteria: Active skin infections, keloid tendency, pregnancy/lactation, recent use of systemic retinoids, or hypersensitivity to treatment.

Intervention

Participants received sequential multimodal facial rejuvenation, including:

- Microneedling for scar remodeling
- Chemical peels for pigmentation and superficial photoaging
- Non-ablative laser therapy for skin texture and wrinkles
- Adjunct therapy (e.g., PRP) to enhance rejuvenation

Treatments were delivered at regular intervals over the study period, with assessments at baseline, 12 weeks post-treatment.

Outcome Measures

- **Primary:** Improvement in photoaging (Glogau Wrinkle Scale) and acne scars (Goodman & Baron Scale)
- **Secondary:** Patient satisfaction and treatment-related adverse effects

Data Analysis

Data were analyzed using SPSS version 27. Continuous variables were expressed as mean ± SD, categorical variables as frequencies (%). Pre- and post-treatment outcomes were compared using paired t-test or Wilcoxon signed-rank test, with $p < 0.05$ considered significant.

RESULTS

Participant Characteristics

A total of **130 participants** completed the study, including 70 (53.8%) females and 60 (46.2%) males. The mean age was 34.5 ± 8.2 years (range 18–55 years). Fitzpatrick skin types were distributed as follows: Type III – 38 (29.2%), Type IV – 66 (50.8%), and Type V – 26 (20%) (Table 1).

Table 1: Demographic and Skin Type Characteristics of Study Participants (n = 130)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	60	46.2
	Female	70	53.8
Age (years)	Mean ± SD	34.5 ± 8.2	–
	Range	18–55	–
Fitzpatrick Skin Type	Type III	38	29.2
	Type IV	66	50.8
	Type V	26	20

Effect on Photoaging and Acne Scars

The effectiveness of sequential facial rejuvenation treatments was assessed using the Glogau Wrinkle Scale for photoaging and the Goodman & Baron Quantitative Scale for atrophic acne scars.

Table 2: Changes in Glogau Wrinkle Scale Scores before and After 12 Weeks of Treatment (n = 130)

Time Point	Mean Score ± SD	Improvement (%)
Baseline	2.87 ± 0.68	–
Post-treatment	1.72 ± 0.64	40.1

These results demonstrate a significant reduction in photoaging and acne scar severity over the 12-week treatment period. The mean Glogau wrinkle score decreased from 2.87 ± 0.68 at baseline to 1.72 ± 0.64 post-treatment, reflecting a 40.1% improvement (Table 2), while the Goodman & Baron score decreased from 18.5 ± 4.6 to 10.8 ± 3.9, reflecting a 41.6% improvement (Table 3).

Table 3: Changes in Goodman & Baron Acne Scar Scores Before and After 12 Weeks of Treatment (n = 130)

Time Point	Mean Score ± SD	Improvement (%)
Baseline	18.5 ± 4.6	–
Post-treatment	10.8 ± 3.9	41.6

Patient Satisfaction

Patient satisfaction following the 12-week sequential facial rejuvenation treatment was generally high. As shown in the Figure Ⅰ, 42.3% of participants reported being very satisfied and 40.8% were satisfied, totaling 82.3% of participants expressing positive satisfaction. A smaller proportion reported neutral (10.8%) or dissatisfied (6.1%) responses, while no participants reported being very dissatisfied.

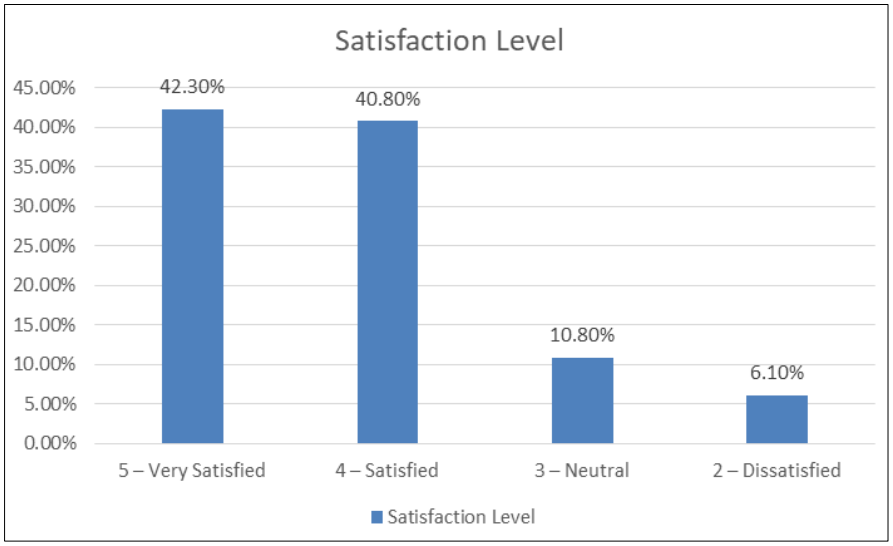

Figure Ⅰ: Patient Satisfaction Post-Treatment (n = 130)

Adverse Effects

Adverse effects were generally mild and transient. Erythema occurring in 7 participants (5.4%), followed by mild edema in 5 participants (3.8%) and temporary hyperpigmentation in 3 participants (2.3%). No severe adverse events were reported (Table 5).

Table 5: Adverse Effects Observed After Treatment (n = 130)

Adverse Effect	Frequency (n)	Percentage (%)
Erythema	7	5.4
Mild edema	5	3.8
Temporary hyperpigmentation	3	2.3
Severe adverse events	0	0

DISCUSSION

In this study of 130 participants, females slightly predominated (70, 53.8%; 60 males, 46.2%; female-to-male ratio ≈1.17:1), reflecting common patterns in dermatologic research where women often participate more due to health-seeking behavior and cosmetic concerns (systematic review in acanthosis nigricans: ~69% females) [11]. The mean age was 34.5 ± 8.2 years (range 18–55), similar to other adult dermatology cohorts, which often report mean ages in the third to fourth decade [12]. In the present study, the majority of participants belonged to Fitzpatrick skin Type IV (50.8%), followed by Type III (29.2%) and Type V (20%). This distribution is consistent with findings from populations with higher proportions of skin of color, where Types III–IV are commonly predominant. For instance, Wang *et al*., (2025) reported that in melasma clinical trials, more than 75% of participants were of Fitzpatrick Types III–IV, reflecting the higher prevalence of pigmentary disorders in these skin types [13]. The predominance of Type IV in our study population aligns with these observations, highlighting the relevance of including darker skin types in clinical studies on photoaging and atrophic acne scars.

The mean Glogau Wrinkle Scale score decreased from 2.87 ± 0.68 to 1.72 ± 0.64, a 40.1% improvement. These findings are in line with the established understanding of acne scar pathogenesis and treatment outlined by Fabbrocini *et al*., (2010), who emphasized that atrophic acne scars result from localized dermal collagen loss and that their improvement requires interventions that stimulate collagen remodeling and dermal regeneration [14].

For atrophic acne scars, the mean Goodman & Baron score decreased from 18.5 ± 4.6 to 10.8 ± 3.9, reflecting a 41.6% improvement, which aligns with prior quantitative scar studies reporting substantial score reductions following procedural treatments. For example, fractional radiofrequency microneedling reduced Goodman & Baron mean scores by ~34% in a clinical series, with significant scar improvement observed across patients [15]. Other interventions, such as CO_2 laser or combination therapies, have achieved even higher percentage reductions (~57–70%), highlighting the clinical relevance of scar score decreases as a valid outcome measure [16].

Patient satisfaction in the present study was high, with 82.3% of participants reporting they were satisfied or very satisfied following 12 weeks of sequential facial rejuvenation. This is consistent with findings from Al-Atif *et al*., (2024), who reported similarly high satisfaction rates among recipients of cosmetic facial procedures in dermatology clinics in Saudi Arabia, highlighting those well-structured aesthetic interventions are generally associated with positive patient-perceived outcomes [17].

Adverse effects following the 12-week sequential facial rejuvenation treatment were generally mild and transient, with erythema in 5.4%, mild edema in 3.8%, and temporary hyperpigmentation in 2.3% of participants, and no severe events reported. These findings are consistent with prior studies, where short-term side effects of nonablative lasers and energy-based treatments were predominantly mild, including erythema (5–12%), edema (3–7%), and transient hyperpigmentation (1–4%), all resolving without intervention [18–20]. Overall, the low incidence of minor adverse effects in this study supports the favorable safety and tolerability of sequential multimodal facial rejuvenation treatments.

Conclusion

Sequential facial rejuvenation treatments are effective, safe, and well-tolerated for improving both photoaging and atrophic acne scars. Over a 12-week period, participants demonstrated significant reductions in Glogau wrinkle scores (40.1%) and Goodman & Baron acne scar scores (41.6%), reflecting enhanced dermal remodeling and collagen stimulation. High levels of patient satisfaction (82.3%) further support the clinical relevance and acceptability of these multimodal, staged interventions. Adverse effects were mild and transient, with no severe events reported, confirming a favorable safety profile. These findings underscore that structured sequential protocols offer a comprehensive and reliable approach for aesthetic facial rejuvenation in diverse patient populations, providing both objective improvements and positive patient-perceived outcomes.

References

1. Kim BJ, Choi JH, Lee Y. Development of facial rejuvenation procedures: thirty years of clinical experience with face lifts. Archives of plastic surgery. 2015 Sep;42(05):521-31.
2. Qoreishi SH, Gholizadeh N, Rokni GR, Babaei M. Advancements in Acne Scar Treatment: Exploring Novel Therapies. Journal of Cosmetic Dermatology. 2025 May;24(5):e70183
3. Tierney EP, Hanke CW. Recent advances in combination treatments for photoaging: review of the literature. Dermatologic surgery. 2010 Jun;36(6):829-40.
4. Rullan PP, Olson R, Lee KC. A combination approach to treating acne scars in all skin types: carbolic chemical reconstruction of skin scars, blunt Bi-level cannula subcision, and microneedling—a case series. The Journal of Clinical and Aesthetic Dermatology. 2020 May 1;13(5):19.
5. Knight JM, Kautz G. Sequential facial skin rejuvenation with intense pulsed light and non-ablative fractionated laser resurfacing in fitzpatrick skin type II–IV patients: A prospective multicenter analysis. Lasers in Surgery and Medicine. 2019 Feb;51(2):141-9.
6. García PN, Andrino RL. Resurfacing of atrophic facial acne scars with a multimodality CO2 and 1570 nm laser system. Journal of Cosmetic Dermatology. 2024 Apr;23:13-8.
7. Tran BQ, Tran TN, Doan EV, Nguyen TT, Nguyen HT. Simultaneous versus sequential fractional CO2 laser and subcision combination for management of post-acne atrophic scars: A split-face comparative study. Journal of Cosmetic Dermatology. 2024 Oct;23(10):3210-21.
8. Nilforoushzadeh MA, Faghihi G, Jaffary F, Haftbaradaran E, Hoseini SM, Mazaheri N. Fractional carbon dioxide laser and its combination with subcision in improving atrophic acne scars. Advanced biomedical research. 2017 Jan 1;6(1):20.
9. Rahman S, Naveed T, Afridi IU, Suhail MA, Khan D, Khan M, Shiraz Z. Comparison of efficacy of micro-needling plus platelet-rich plasma and fractional CO2 laser plus platelet-rich plasma in the treatment of post-acne scars.
10. Ptaszek B, Czernecka M, Podsiadło S. The Use of a Fractional Laser in Acne Scar Treatment—A Systematic Review. Life. 2025 Jun 4;15(6):915.
11. Wang JY, Bitterman D, Patel P, Kabakova M, Zafar K, Cohen M, Jagdeo J. Gender, racial, ethnic, and Fitzpatrick skin type representation in Acanthosis nigricans clinical trials. Archives of Dermatological Research. 2024 Jun 6;316(6):332.
12. Hao JC, Zhou X, Cheng SW. Global, Regional, and National Trends in Pruritus Burden from 1990 to 2021. Dermatology. 2025 Nov 6.
13. Wang JY, Zafar K, Bitterman D, Patel P, Kabakova M, Cohen M, Jagdeo J. Gender, Racial, and

Fitzpatrick Skin Type Representation in Melasma Clinical Trials. Journal of drugs in dermatology: JDD. 2025 Jan 1;24(1):19-22.

14. Fabbrocini G, Annunziata MC, D′ Arco V, De Vita V, Lodi G, Mauriello MC, Pastore F, Monfrecola G. Acne scars: pathogenesis, classification and treatment. Dermatology research and practice. 2010;2010(1):893080.
15. Navyadevi U, Ganni S, Satya S, Konala S, Kolalapudi SA, Chilka SP, Anargha B. Efficacy and safety of microneedling radiofrequency in acne scars. Journal of Cutaneous and Aesthetic Surgery. 2024 Oct 21;17(4):315.
16. Al Mallah MN, Abdulqader MN, Al Chalabi QS, Fathi HB. Atrophic Acne Scars Treated With Microneedling Radiofrequency Followed by Fractional CO2Laser Compared With Each Monotherapy: An Open-Label Randomized Controlled Trial. International Journal of Dermatology and Venereology. 2025 Sep 1;8(3):134-9.
17. Al-Atif HM, Alqarni AM, Almuntashiri AA, Almuntashiri AS, Almarhabi MA. Satisfaction Among Recipients of Cosmetic Facial Filling Procedures at Dermatology Clinics in Saudi Arabia: A National Study. Clinical, Cosmetic and Investigational Dermatology. 2024 Dec 31:2465-74.
18. Fisher GH, Geronemus RG. Short-term side effects of fractional photothermolysis. Dermatologic surgery. 2005 Sep;31:1245-9.
19. Hu S, Atmakuri M, Rosenberg J. Adverse events of nonablative lasers and energy-based therapies in subjects with Fitzpatrick skin phototypes IV to VI: a systematic review and meta-analysis. Aesthetic Surgery Journal. 2022 May 1;42(5):537-47.
20. Alam M, Kakar R, Nodzenski M, Ibrahim O, Disphanurat W, Bolotin D, Borovicka JH, Pace N, Alster TS, Arndt KA, Beer KR. Multicenter prospective cohort study of the incidence of adverse events associated with cosmetic dermatologic procedures: lasers, energy devices, and injectable neurotoxins and fillers. JAMA dermatology. 2015 Mar 1;151(3):271-7.