The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 2, 2025

# COMPARISON OF EFFICACY OF MICRO NEEDLING AND 5% GLYCOLIC ACID PEEL IN TREATMENT OF ACNE SCARS

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**DOI:** https://doi.org/10.5281/zenodo.14946932

**Keywords**
*Acne scars, Glycolic acid peel, Microneedling, Patient satisfaction, Skin texture improvement.*

**Article History**
Received on 17 January 2025
Accepted on 17 February 2025
Published on 28 February 2025


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**Abstract**

***Background:*** *Common dermatological issue causing poor quality of life for patients is acne scars. Scar look has been enhanced with several procedures including chemical peels and microneedling. The safety and effectiveness of 5% glycolic acid peel and microneedling in treating acne scars were compared in this study.* ***Objectives****: To assess and contrast for acne scar therapy the efficiency, patient satisfaction and side effects of 5% glycolic acid peel and microneedling.* ***Methods:*** *From November 2024 to February 2025, a cross-sectional study used a practical sample method, 184 patients in all with atrophic acne scars were enrolled. Two groups were formed from the participants: Group A had microneedling and Group B underwent treatment with 5% glycolic acid peel. Every group got four sessions of treatment separated three weeks apart. Reduction in scar grade (Goodman and Baron Scale), patient satisfaction (VAS scores), and subjective improvement in skin texture all helped to gauge efficacy. We noted negative outcomes including infection, hyperpigmentation and erythema.* ***Results:*** *Scar grades (1.7 ± 0.4) were considerably reduced in the microneedling group as opposed to the glycolic acid peel group (1.3 ± 0.3). Group A's (8.2 ± 1.1) patient satisfaction was higher than Group B's (7.5 ± 1.3). Approaching statistical significance (p = 0.07), Group A (78%) showed more subjective improvement in skin texture than Group B (65%). Though the variances were not statistically significant (p = 0.72), Group B had somewhat more adverse effects with higher frequencies of erythema (19% vs. 14%) and hyperpigmentation (16% vs. 11%).* ***Conclusion:*** *With better scar improvement, patient satisfaction, and same safety, microneedling is more successful than 5% glycolic acid peel for treating acne scars. Particularly for deeper scar types, it is advised as a first-line treatment for moderate-to-severe acne scars.*

## INTRODUCTION

Acne scars are most common dermatological issues that sometimes cause psychological pain and lower quality of life for people. The inflammatory processes linked to acne produce these scars that cause aberrant wound healing and skin collagen degradation (1-2). Given that around 85% of teenagers and young adults suffer with acne, burden of acne scarring is great, so efficient treatment approaches become very important in clinical work (3-4).

Designed to target particular facets of the scarring process, a range of treatments have been developed to treat acne scars. Among these, glycolic acid peels and microneedling have turned out as least intrusive, efficient choices (5-7). Microneedling, also known as collagen induction therapy, involves the use of fine needles to create controlled micro-injuries in the skin. This procedure increases collagen generation, stimulates the release of growth factors and helps skin remodeling, therefore improving the look of scars. Its popularity results from its low downtime and few side effects ability to heal many kinds of scars, including atrophic scars (8).

Conversely, glycolic acid peel—a form of chemical exfoliation—uses alpha-hydroxy acids (AHAs) to encourage cell turnover and exfoliation of the outermost layer of the skin. Designed especially for delicate skin types, 5% glycolic acid peel gently exfoliates and increases collagen formation in deeper dermal layers (9-10). Dermatology makes great use of it since it can minimize the visibility of acne scars and enhance skin texture and tone (11).

Although glycolic acid peels and microneedling are acknowledged as good treatments for acne scars, their relative effectiveness is still under active study. With glycolic acid peels emphasizing surface-level exfoliation and rejuvenation and microneedling targeting deeper skin layers, each treatment has special advantages. Maximizing treatment plans catered to specific patient demands depends on an awareness of the relative benefits of different measures (12).

The purpose of this study was to evaluate in the treatment of acne scars the effectiveness of 5% glycolic acid peel and microneedling. This study aimed to offer evidence-based insights on the choice of suitable therapy choices for persons with acne scarring by assessing enhancements in scar appearance, skin texture, and patient satisfaction.

## Materials and Methods

### Study Design and Setting

From November 2024 till February 2025, this comparative study was carried out in the Dermatology Department of Combined Military Hospital (CMH) Abbottabad. The study sought to treat acne scars (Figure 1) using microneedling and 5% glycolic acid peel, evaluating their respective efficacy.

### Study Population

The study comprised atrophic, moderate to severe acne scars categorized as either male or female patients aged 18 to 40 years. Patients excluded were those with current acne, keloid development, active skin infections, pregnancy, lactation, past six-month oral isotretinoin use or other dermatological problems.

### Sample Size and Sampling Technique

Calculated to give sufficient statistical power to identify notable variations between the two treatment approaches, the sample size for the study was 184 participants. Convenient sampling was used to choose the participants depending on their availability and desire to take part.

### Study Protocol

Two groups were formed via random allocation of the participants:

**Group A**: Received microneedling therapy.

**Group B**: Treated with 5% glycolic acid peel.

Before the study started, every participant gave written informed permission. The institutional ethical review board of CMH Abbottabad approved the study.

### Intervention Details

Microneedling was carried out with a dermaroller with needle lengths varying from 1.5 to 2 mm. The treatment region was cleaned using antiseptic solution then topical anesthetic was applied. Thirty minutes later the anesthesia was taken off and several directions—vertical, horizontal, and diagonal—microneedling was done until mild erythema was

seen. A calming gel and sunscreen were part of post-operative treatment. Every three weeks, sessions took place totaling four sessions over the course of the research.

**5% Glycolic Acid Peel**

Designed for delicate skin types, 5% glycolic acid peel (Group B) was performed at varying dosages. The treatment area was cleaned, then the peel was sprayed with a cotton applicator. The peel was neutralized using sodium bicarbonate solution following 3–5 minute contact time. Moisturizing cream and sunscreen application constituted part of post-procedural care. Treatments consisted in four sessions spread every three weeks.

**Outcome Assessment**

Efficacy was assessed by:

1. Clinical Evaluation: Acne scars were scored on the Goodman and Baron Scar Grading Scale both before and following the last session. Scar grades improved as noted.
2. Patient Satisfaction: At the conclusion of the study, participants answered their degree of satisfaction on the 10-point visual analog scale (VAS)
3. Adverse Events: Every side event, including infection, hyperpigmentation and erythema, was noted.

**Data Collection and Analysis**

Structured proformas were used for data collecting including treatment results, clinical history and demographic information. SPSS version 26.0 entered the data for statistical analysis. Whereas continuous variables were compiled as means and standard deviations, categorical variables were stated as frequencies and percentages. Pre- and post-treatment results as well as group variations were compared using the paired t-test and chi-square test. We considered p-value of under 0.05, being significant.

**Ethical Considerations**

Every subject gave informed permission and throughout the research confidentiality was kept. Ethical clearance came from CMH Abbottabad's institutional review board.

**Results**

Indicating a similar age distribution between the two groups, average age of participants in the microneedling group was 28.5 ± 4.2 years, whereas in the glycolic acid peel group it was 29.2 ± 3.9 years. With no statistically significant difference noted, gender distribution revealed almost equal participation of men and women in both groups. Based on the Fitzpatrick scale, type III and IV skin predominated in both groups; Group A had 41% type III and 59% type IV, Group B had 38% type III and 62% type IV. With Group A exhibiting 23, 47 and 30%, respectively, and Group B showing 27, 45 and 28%, scar type analysis revealed that the distribution of Icepick, Rolling and Boxcar scars was also comparable between the groups. Though the difference was not statistically significant, Group A's baseline scar grades—3.8 ± 0.7—were somewhat higher than Group B's—3.7 ± 0.6. Both groups saw post-treatment scar grades improved; Group A showed more progress (2.1 ± 0.5) than Group B (2.4 ± 0.6). As a result, the microneedling group (1.7 ± 0.4) showed more clearly a decrease in scar grades than the glycolic acid peel group (1.3 ± 0.3. With mean VAS score of 8.2 ± 1.1 compared to 7.5 ± 1.3 in Group B, patient satisfaction was likewise greater in Group A. With erythema seen in 19%, hyperpigmentation in 16% and infection in 2% of individuals, the glycolic acid peel group had more adverse effects than the microneedling group—14%, 11%, and 3%, respectively (Table 1).

With the mean improvement of 1.7 ± 0.4 in the microneedling group against 1.3 ± 0.3 in the glycolic acid peel group, scar grades dropped more in that group. This implies that microneedling helps to reduce acne scars more successfully (Figure 1). Higher VAS scores in the microneedling group (8.2 ± 1.1) compared to the glycolic acid peel group (7.5 ± 1.3) reflect a larger felt benefit among participants treated with microneedling, therefore following a similar trend for patient satisfaction. Regarding changes in skin texture, the microneedling group displayed a greater proportion of subjective improvement—78%—than the glycolic acid peel group—65%. With identical tolerability in terms of side effects, the results imply that microneedling is more effective overall in lowering scar severity,

enhancing skin texture and obtaining higher patient satisfaction than the 5% glycolic acid peel (Table 2).

In acne scar treatment, the side effects of 5% glycolic acid peel with microneedling. In Group A, 14% of the subjects showed Erythema; in Group B, just 19%. Analogous frequency of hyperpigmentation was Group B (16%) compared to Group A (11%). Fascinatingly, Group A (3%) had rather higher infection rates than Group B (2%). Group B (14% and 18% respectively) also more often experienced burning feeling and peeling/flaking than Group A (9% and 12%, respectively). The glycolic acid peel group showed somewhat more frequency of adverse effects overall, suggesting improved microneedling tolerance (Figure 2).

Microneedling and 5% glycolic acid peel show the improvement in several scar types—Icepick, Rolling, and Boxcar). Microneedling had a better improvement rate—about 68%—for Icepick scars than glycolic acid peel (about 58%). Likewise, for rolling scars, microneedling improved about 72% compared to glycolic acid peel at roughly 63%. Microneedling once more showed greater results for Boxcar scars—64% improvement over 52% with glycolic acid peel. All types of scars were consistently improved by microneedling generally over glycolic acid peel (Figure 3).

**Table 1:** Comparison of microneedling and 5% glycolic acid peel in the treatment of acne scars

| Parameter | Microneedling (Group A) | Glycolic Acid Peel (Group B) | Chi-Square Value | p-Value |
|---|---|---|---|---|
| Age (years) | 28.5 ± 4.2 | 29.2 ± 3.9 | - | - |
| Gender<br>Male<br>Female | <br>45<br>47 | <br>43<br>49 | 1.23 | 0.27 |
| Skin Type (Fitzpatrick Scale) %<br>III<br>IV | <br>41<br>59 | <br>38<br>62 | - | - |
| Scar Type (%)<br>Icepick<br>Rolling<br>Boxcar | <br>23<br>47<br>30 | <br>27<br>45<br>28 | 2.56 | 0.11 |
| Baseline Scar Grade (Mean ± SD) | 3.8 ± 0.7 | 3.7 ± 0.6 | - | - |
| Post-Treatment Scar Grade (Mean ± SD) | 2.1 ± 0.5 | 2.4 ± 0.6 | - | - |
| Reduction in Scar Grade (Mean ± SD) | 1.7 ± 0.4 | 1.3 ± 0.3 | - | - |
| Patient Satisfaction (VAS) (Mean ± SD) | 8.2 ± 1.1 | 7.5 ± 1.3 | - | - |
| Adverse Effects (%)<br>Erythema<br>Hyperpigmentation<br>Infection | <br>14<br>11<br>3 | <br>19<br>16<br>2 | 0.65 | 0.72 |

**Table 2:** Post-Treatment Outcomes of Microneedling and 5% Glycolic Acid Peel in Acne Scar Treatment

| Outcome Measure | Microneedling (Group A) | Glycolic Acid Peel (Group B) | Chi-Square Value | p-Value |
|---|---|---|---|---|
| Reduction in Scar Grade (Mean ± SD) | 1.7 ± 0.4 | 1.3 ± 0.3 | - | - |
| Patient Satisfaction (VAS, Mean ± SD) | 8.2 ± 1.1 | 7.5 ± 1.3 | - | - |
| Improvement in Skin Texture (%, Subjective Assessment) | 78 | 65 | 3.28 | 0.07 |

**Figure 1: Before and after result of 5-6 microneedling sessions**

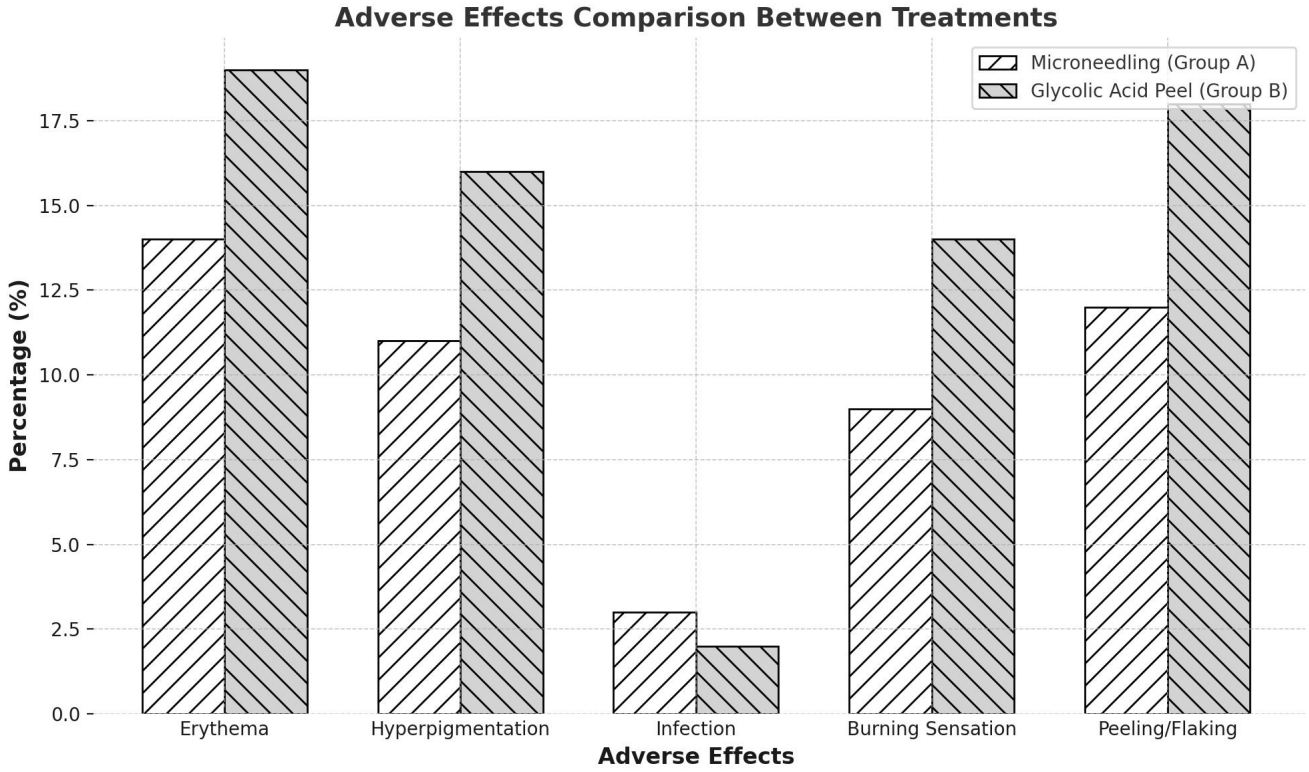


**Figure 2:** Adverse Effects Comparison between Microneedling and 5% Glycolic Acid Peel

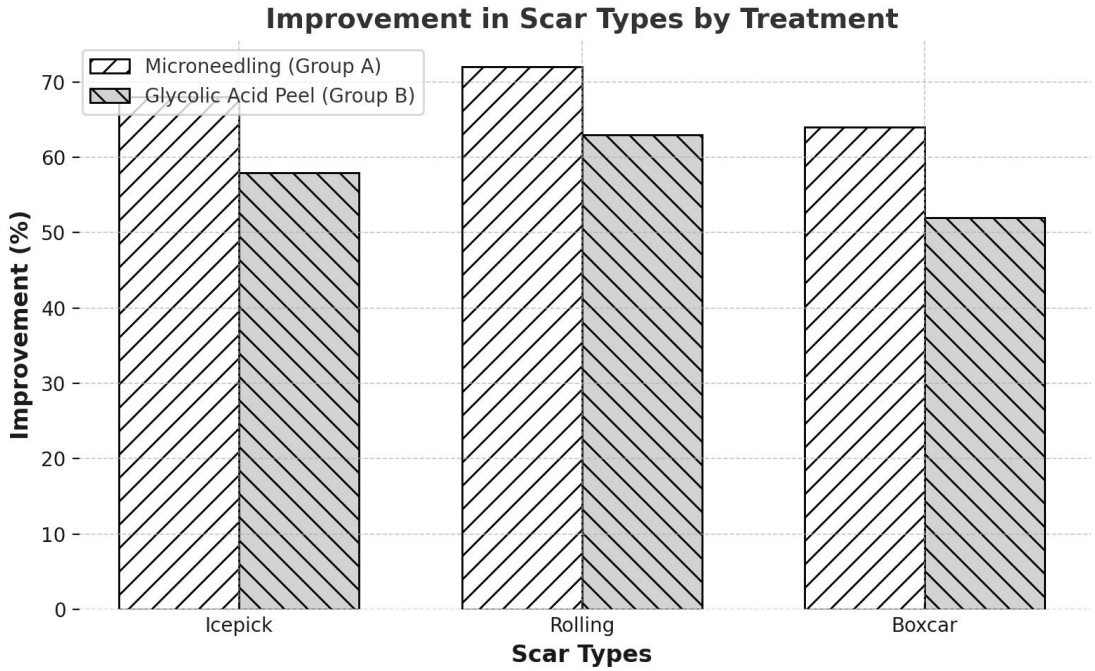


**Figure 3:** Improvement in Scar Types Achieved by Microneedling and 5% Glycolic Acid Peel

**Discussion**

This study aimed to compare the efficacy and safety of microneedling and 5% glycolic acid peel in the treatment of acne scars. Our findings indicated that microneedling demonstrated superior outcomes in terms of scar grade reduction, patient satisfaction and improvement in skin texture compared to the glycolic acid peel. Both treatments showed comparable tolerability, with slightly fewer adverse effects reported in the microneedling group.

With somewhat less side effects recorded in the microneedling group, both treatments displayed similar tolerance. Scar grades in the microneedling group (1.7 ± 0.4) showed a better decline than those in the glycolic acid peel group (1.3 ± 0.3). This is in line with results from Ishfaq et al. (2022) [6], who found that microneedling successfully causes collagen remodeling, so improving acne scars. Likewise, 13.Shahbano et al. (2023) discovered that, compared to chemical peels, microneedling is especially helpful for atrophic scars, hence reducing scar severity. Microneedling's great efficiency can be ascribed to its capacity to induce dermal collagen synthesis by means of controlled micro-injuries, therefore encouraging scar reformation and skin regeneration (13).

With a mean VAS score of 8.2 ± 1.1 relative to 7.5 ± 1.3 in the glycolic acid peel group, patient satisfaction was also better in the microneedling group. Greater satisfaction with microneedling corresponds with results by Memon et al. (2022), who found patients having microneedling felt better generally in terms of scar look and skin texture. This subjective evaluation probably results from the deeper dermal effects obtained by microneedling, which are less noticeable with surface procedures such as glycolic acid peels (14).

With regard to particular scar types, microneedling improved Icepick (68% vs. 58%), Rolling (72% vs. 63%), and Boxcar scars (64% vs. 52%). These findings align with Singh and Yadav (2016), who observed that, where collagen stimulation is essential for tissue healing, microneedling is especially successful for deeper scar types like rolling and boxcar scars. Glycolic acid peels, on the other hand, are mostly effective for superficial layers of the skin, so they are not very helpful for deeper scars (15).

Though the differences were not statistically significant ($p = 0.72$), the glycolic acid peel group had somewhat more frequency in adverse effects including erythema, hyperpigmentation, and infection than in the microneedling group. These results are consistent with studies by Măgeruşan et al. (2014), who concluded that, when done properly, microneedling has a positive safety profile while chemical peels are more likely to produce transitory irritation and pigment alterations (16).

Our research adds to the mounting data confirming microneedling as a safe and efficient acne scar therapy. Although glycolic acid peels are still a great choice for minor scar correction and skin renewal, microneedling provides best outcomes for a wider spectrum of scar types. These results underline the significance of customizing treatment strategies to the particular needs of individuals depending on intended results and scar features.

This study had significant restrictions. First of all, long-term results were not evaluated and the follow-up time was somewhat brief. Second, the study applied a convenient sample methodology, which can restrict the generalizability of the outcomes.

**Conclusion**

Particularly for deeper scar types such rolling and boxcar scars, microneedling proved better than 5% glycolic acid peel in lowering acne scar grades, enhancing skin texture and increasing patient satisfaction. Though these variations were not statistically significant, the glycolic acid peel shown somewhat higher rates of unpleasant effects, including erythema and hyperpigmentation, even if it was beneficial for superficial scars. Both therapies were tolerated well, underscoring their clinical practice safety. These results confirm microneedling as a better choice for treating many kinds of acne scars.

**Conflict of Interest**

None.

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