



"MICRONEEDLING WITH 70% GCA PEEL VS. MICRONEEDLING ALONE FOR ATROPHIC ACNE SCAR TREATMENT: COMPARATIVE STUDY"

Dermatology

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ABSTRACT

Objective: "This study aimed to evaluate the efficacy of combining microneedling with 70% glycolic acid peels for atrophic acne scar treatment."

Methods: A comparative study was conducted on 60 patients with atrophic acne scars, divided into two groups. Group 1 received microneedling alone, while Group 2 received microneedling with 70% glycolic acid peels. **Results:** Both groups showed improvements in scar grades, visual scores, and skin texture, with Group 2 demonstrating greater enhancement. Adverse effects were minimal. **Conclusion:** Combining microneedling with 70% glycolic acid peels appears to be a promising option for atrophic acne scar treatment.

KEYWORDS

Acne scar, Microneedling with 70% glycolic acid peels

INTRODUCTION

Acne is a chronic inflammatory condition affecting hair follicles and sebaceous glands and it is characterized by increased sebum production, the formation of comedones, inflamed papules and pustules, and potential scarring [1]. Various factors contribute to acne development, including excess sebum production, altered sebum lipid composition, androgen activity, proliferation of *Propionibacterium* acnes, and follicular hyperkeratinization [2]. Acne scars having a negative impact on appearance and psychological well-being, which often worsened with advancing age and sun exposure [3].

The treatment of acne scars is a significant challenge for dermatologists, as there is no universally effective treatment modality [4]. Surgical options for atrophic acne scars include micro dermabrasion, chemical peels, subcision, microneedling, resurfacing lasers, and newer approaches like platelet-rich plasma (PRP) [5].

Microneedling, a well-established technique for the past 50 years, has shown efficacy in treating acne scars. By creating micro-punctures in the skin using a dermaroller, it stimulates neocollagenesis and neo-angiogenesis, leading to scar improvement [6]. Microneedling is often combined with other treatments such as subcision, PRP, and chemical peels [7].

Glycolic acid (GA), an alpha-hydroxylic acid, has been extensively studied for its effectiveness in treating acne scars [8]. It can penetrate the upper papillary dermis, modulate fibroblasts, and increase connective tissue synthesis. Additionally, GA resurfaces the epidermis, reducing melanin content and improving hyper pigmentation [9]. Studies have shown that microneedling alone can reduce scar grades in a significant number of patients [10]. Combining microneedling with sequential 70% glycolic acid peels not only enhances scar improvement but also improves skin texture and radiance [6].

Although both microneedling and glycolic acid peels have shown effectiveness as individual treatments, there is a lack of research on their combined efficacy [11]. Glycolic acid peels were selected for this study based on their widespread use, extensive history, and their ability to target the layers within the epidermis [12]. Currently, there is a shortage of objective clinical trials that evaluate the effectiveness of microneedling for various types of scars, and previous studies often lack standardized grading scales for scar assessment.

MATERIAL AND METHOD:

This comparative study was conducted at the Department of Dermatology, Career Institute of Medical Sciences and Hospital, Lucknow, U.P. The study duration spanned from January 2021 to June 2022. The study sample consisted of 60 patients with atrophic acne scars, with a minimum scoring of 15 according to the ECCA grading scale. Patients who provided written consent, were older than 18 years, and met the inclusion criteria were included in the study.

Exclusion criteria encompassed patients who had taken systemic

retinoids or immunosuppressive drugs in the past three months, individuals with coagulation defects or bleeding disorders, those with a history or evidence of keloid scars, active or recurrent herpes, pregnancy and lactation, active acne lesions, patients on antidepressants, and those with unrealistic expectations.

Simple random sampling using computer-generated random numbers was employed to select the participants. The patients were divided into two groups. Group 1 received microneedling sessions at 0, 6, and 12 weeks, while Group 2 received microneedling sessions at 0, 6, and 12 weeks, along with 70% glycolic acid peels at 3, 9, and 15 weeks.

Group 1: Micro-needling

After application of local anesthetic cream (eutectic mixture of prilocaine and lignocaine) under occlusion for approximately 45 to 60 minutes to the affected areas before the procedure, the face was sterilized with povidone-iodine and alcohol. The treatment was performed by rolling needling tool over the areas affected by acne scars five times in the four directions (vertical, horizontal, and diagonal) without pressing too hard (lips and eyelids were avoided). Wet gauze swabs were used to soak up bleeding and any fluid ooze. After the procedure, a topical antibiotic was applied at the treatment site.

Group 2: Microneedling And 70% Glycolic Acid Peeling

After giving one session of derma rolling, patients were called after 2 weeks. After cleaning and degreasing the skin with acetone, 70% GCA peel was applied over the face using a wooden cotton applicator beginning with the forehead and advancing down to the cheek, chin, and nasal areas in a clockwise fashion.

The desired endpoint of the peel was an even erythema, stinging or burning sensation, whichever comes first. Peel was neutralized with a bicarbonate solution and patient was asked to wash the face with water and sunscreen was applied immediately after the procedure.

Detailed clinical history was obtained from each patient, and a comprehensive examination was performed. Baseline scar grading according to the ECCA grading scale was conducted by an independent observer, and photographic records were kept.

Visual analog scoring for scar severity and skin texture improvement was assessed by the patients. Outcome measures included reduction in ECCA scores at 24 weeks and secondary variables such as improvement in visual analog scores for scarring, overall improvement in skin texture, and reduction in downtime between the two groups.

Data were analyzed using the SPSS version 16. Continuous variables were presented as mean $\pm$ standard deviation,

While categorical variables were expressed as numbers and percentages. The unpaired t-test was used to compare the mean ECCA scores between the two groups, with a significance level set at $p < 0.05$.



Image: Microneedling procedure



Image: GA peel procedure

RESULTS:

Out of total 60 patients, majority 32 (53.3%) patients were below or equal to 19 years of age followed by 16 (26.7%) patients of 31-40 years of age, 11 (18.3%) patients were from 41-50 years of age group and 1 (1.7%) patient was above 50. In group A, majority 14 (46.7%) patients were below or 19 years of age followed by 11 (36.7%) patients of 31-40 years of age, 5 (16.4%) patients were from 41-50 years of age group. In group B, majority 18 (60.0%) patients were below or equal to 19 years of age followed by 5 (16.7%) patients of 31-40 years of age, 6 (20.0%) patients were from 41-50 years of age group and 1 (3.3%) patient was above 50.

Mean age of total patients was 32.26 ± 8.5 years. The mean age of Group A and Group B patients was 31.5 ± 17.15 years and 32.26 ± 8.5 years respectively and was found to be statistically non-significant ($p > 0.05$). Out of total 60 patients, majority 37 (61.7%) patients were male and 23 (38.3%) patients were female. In Group A, majority 18 (60.0%) patients were male and 12 (40.0%) patients were female while in Group B, majority 19 (63.3%) patients were male and 11 (36.7%) patients were female. Gender distribution difference was found to be statistically non-significant in both groups ($p > 0.05$).

Table 1: Comparison of Grade scar at baseline, Physician's Evaluation after 1 st sitting, and Physician's Evaluation after 3 rd sitting						
Grade of scar	At Baseline		Physician's		Physician's	
	Group A (N=30)	Group B (N=30)	Group A (N=30)	Group B (N=30)	Group A (N=30)	Group B (N=30)
1	3 (10.0%)	1 (3.3%)	6 (20.0%)	7 (23.3%)	16 (53.3%)	19 (63.3%)
2	9 (30.0%)	11 (36.7%)	10 (33.3%)	12 (40.0%)	5 (16.7%)	6 (20.0%)
3	11 (36.7%)	9 (30.0%)	10 (33.3%)	8 (26.7%)	8 (26.7%)	5 (16.7%)
4	7 (23.3%)	6 (20.0%)	4 (13.3%)	3 (10.0%)	1 (3.3%)	0 (0.0%)
P value	0.723		0.89		0.564	

In the present study distribution of the studied patients was based on the type of scar and it was found that in Group A, the majority 15 (50.0%) patients had Ice pick Scars followed by 8 (26.7%) and 7 (23.3%) patients had Rolling Scar and Box Scar respectively. Cheeks were affected in 46.7% of cases followed by the forehead (20.0%) and chin (20.0%). In Group B, the majority 14 (46.7%) patients had Ice pick Scars followed by 9 (30.0%) and 7 (23.3%) patients had Rolling Scars and Box Scar respectively. Cheeks were affected in 53.4% of cases followed by the forehead (20.0%) and Temporal region (13.3%). The association of acne scars among both groups was found to be statistically insignificant ($p > 0.05$).

In Group A and it was found that a burning sensation was in 20.0% followed by Itching 16.6%, Erythema and Edema (6.7%) each. In Group B, Itching was in 20.0% of cases followed by burning sensation in 13.3% of cases, Edema was in (10.0%) of cases and Erythema was in (6.7%) of cases. In the present study distribution of the studied patients was based on the Physician's Evaluation after 1st sitting and it was found that in Group A, the majority 15 (50.0%) patients had good scores followed by 12 (40.0%) and 3 (10.0%) patients had Poor and Excellent score respectively. The majority of patients had Grades 2 & 3 and Self-evaluation at the end of 1st sitting it was found that the majority of patients had Grades 3 & 6.

In Group B, improvement was seen with 6 (20.0%) patients with Excellent scores and 18 (60.0%) patients were in a good score. Similarly, improvement was seen and patients shifted to Grade of acne Scar 1 & 2. Based on self-evaluation majority of patients shifted to Scar 3 & 5. The association of acne scars among both groups was found to be statistically insignificant ($p > 0.05$).

In the present study, the distribution of the studied patients was based on a comparison of Grade scar at baseline, Physician's Evaluation after 1st sitting, and Physician's Evaluation after 3rd sitting and it was observed that at Baseline maximum patients were in Grade 2 and Grade 3. In Physician's Evaluation after 1st sitting improvement was seen in both groups and patients shifted to Grade 1 and Grade 2 in both groups. Similarly, in Physician's Evaluation after 3rd sitting improvement was seen in both groups and patients shifted to Grade 1 and Grade 2 in both groups, but the maximum improvement was seen in Group B.

DISCUSSION:

In this study, 60 patients were divided into two groups: Group A (Microneedling Alone) and Group B (Microneedling plus 70% GCA), with 30 patients in each group. In Group A, the majority of patients (46.7%) were ≤ 19 years old, followed by patients in the 31-40 (36.7%) and 41-50 (16.4%) age groups. In Group B, the majority (60.0%) were ≤ 19 years old, followed by patients in the 41-50 (20.0%), 31-40 (16.7%), and 251 (3.3%) age groups. The mean age of patients in Group A was 33.03 years, and in Group B it was 31.54 years. This was in concurrence with the study by Gupta M et al [7] majority of the patients (86%) were in the age group of 21-30 years with mean age of 23.74 ± 3.2 years. In the present study, Male dominant over female patients in both groups and the association of both groups found to be insignificant ($p > 0.05$). Chawala S et al [13] reported that Male patients were (70%) and female patients were (30.0%). Leelavathy B et al [14] reported that total 30 participants were included in the study, out of 30 there were 20 males (66.7%) and 10 female (33.3%).

In Fitzpatrick skin type Group A study, majority 11 (36.7%) patients were in type III followed by 8 (26.7%), 7 (23.3%) and 4 (13.3%) patients were in type I, II and VI respectively. In Group B, majority 12 (40.0%) patients were belonged to type III followed by 9 (30.0%), 8 (26.7%) and 1 (3.3%) patient were in type I, II and VI respectively.

The association of Group A and Group B found to be statistically insignificant ($p > 0.05$). Gupta M et al [7] in their study reported that most common type of scars in patients was boxcar scars (39%), followed by icepick (34%) and rolling scars (27%). Ochi M et al [15] reported that two hundred and ten fractional CO₂ laser treatments for facial acne scars were performed on 107 patients (65 men and 42 women, Fitzpatrick skin Types II to V) during the study period. Saeed AHM et al [16] reported that there were nine patients with Fitzpatrick skin type 3, 25 patients with skin type 4, and five patients with skin type 5. Majid I and Imran S [17] in their study reported that there were 3 patients with Fitzpatrick skin type 2, 39 patients with skin type 3 and 18 patients with skin type 4.

In the present study distribution of the studied patients based on type of scar and it was found that in Group A, majority 15 (50.0%) patients had Ice pick Scar followed by 8 (26.7%) and 7 (23.3%) patients had Rolling Scar and Box Scar respectively. Cheeks were affected in 46.7% cases followed by forehead (20.0%) and chin (20.0%). In Group B, majority 14 (46.7%) patients had Ice pick Scar followed by 9 (30.0%) and 7 (23.3%) patients had Rolling Scar and Box Scar respectively. Cheeks were affected in 53.4% cases followed by forehead (20.0%) and Temporal region (13.3%). The association of Group A and Group B found to be statistically insignificant ($p>0.05$). Petrov A and Pijakovska V [18] reported that ice pick scar was commonest (18) followed by rolling (8) and boxcar (7). Sundaram G et al [19] reported that on the basis of the site of involvement, in their study cheek was the most common affected site, with all 30 (100.0%) patients having involvement of cheeks. This was in concurrence with the study by Saeed and Alsaiairi [16] in which 95.0% of patients had involvement of cheeks. Majid I and Imran S [17] their study reported that all the cases had moderate to severe atrophic post-acne scars (Grade 3 and 4 scars by Goodman and Baron Classification system). In majority of cases (35 out of 60), all the different morphological types of atrophic scars were present.

In the present study the distribution of the studied cases was done on the basis of problem faced immediate post-treatment in Group A and it was found that burning sensation was in 20.0% followed by Itching 16.6%, Erythema and Edema (6.7%) each. In Group B, Itching was in 20.0% cases followed by burning sensation was in 13.3% cases, Edema was in (10.0%) cases and Erythema was in (6.7%) cases. The association of both groups found to be statistically insignificant ($p>0.05$). Dogra et al [20] reported that less erythema and edema and less the overall downtime in the side was treated with skin needling and PRP in comparing to other side treated skin needling alone. In Sundaram G et al [19] study, the most commonly observed side effect was erythema in 12 (7.4%) patients, burning sensation and erythema in five (18.5%) patients, erythema and edema in three (11.1%) patients and burning, erythema, and edema in three (11.1%) patients. Only one patient developed post-inflammatory hyperpigmentation (PIH). All the side effects were transient and resolved spontaneously. Ramesh M et al [21] observed transient treatment site edema, burning sensation (1 hour), mild scaling and crusting. Saeed AHM and Alsaiairi SA [16] reported that most of the patients had associated adverse effects noted to the treatment regimen, which found to be extremely variable and transient. These included 95.0% with mild erythema, 77.5% with superficial crusting, and 67.5% with transient edema. The only significant adverse effect observed was post-inflammatory hyperpigmentation that developed in two cases in our study. This pigmentation resolved with topical therapy over a period of 2-3 months.

In the present study the distribution of the studied patients based on comparison of Grade scar at baseline, Physician's Evaluation after 1st sitting, and Physician's Evaluation after 3rd sitting and it was observed that at Baseline maximum patients were in Grade 2 and in Grade 3. In Physician's Evaluation after 1st sitting improvement was seen in both groups and patients shifted to Grade 1 and Grade 2 in both groups. Similarly, in Physician's Evaluation after 3rd sitting improvement was seen in both groups and patients shifted to Grade 1 and Grade 2 in both groups, but the maximum improvement was seen in Group B of the Physician's Evaluation after 3rd sitting. The study of Majid et al [17] showed that the severity of scars improved by two or more grades in 72.2% and 16.7% of patients had improvement by a single grade. Sharad et al [11] assessed the efficacy of microneedling alone versus a combination of micro needling and 35% glycolic acid peels in 30 patients for the management of acne scars with 31% and 60% improvement after five sittings. It was observed that post-inflammatory hyperpigmentation and macular erythematous scars also decreased in a few patients.

Limitations & Recommendation:

Limitations of the study include a relatively small sample size and a limited number of microneedling and 70% glycolic acid sessions. The study lacked a control group, a blinded evaluator, and relied on subjective evaluation of acne scars. The follow-up duration was also limited to 3 months, while optimal benefits may take at least 6 months to observe.

Recommendations for future research include conducting controlled studies with larger sample sizes, exploring the optimal number of

treatment sessions and intervals, and using more reliable and widely accepted evaluation criteria. Further research on the effectiveness of combination therapy is also recommended, provided the circumstances allow for it.

CONCLUSION:

The treatment of acne scars requires a personalized approach, as there is no universal solution or instant remedy. Achieving optimal results often involves multiple sessions using different treatment modalities. Since acne scars can exhibit diverse morphologies and multiple types of scars may be present in the same patient, combination therapy is often necessary to deliver the most effective treatment. The present study highlights the positive outcomes observed with both Microneedling Alone and Microneedling combined with 70% GCA (glycolic acid). Both treatment approaches proved to be effective in addressing atrophic acne scars, yielding comparable and satisfactory results.

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