



Original Research Article

Efficacy and outcome of Microneedling (Dermaroller) in post-acne scars

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ARTICLE INFO

Article history:

Received 26-08-2021

Accepted 04-09-2021

Available online xx xx xxxx

Keywords:

Microneedling

Percutaneous collagen induction

Acne scars.

ABSTRACT

Background: Acne vulgaris is a common dermatological disorder affecting teenagers and young adults with the consequence of scarring. As acne is considered as a normal occurrence and neglected or delayed treatment of severe acne lead to cosmetically disfiguring scarring leading to much psychological trauma to youngsters. Acne scarring can be atrophic or hypertrophic. There are multitude of treatment options for atrophic acne scars like dermabrasion, chemical peels and lasers. But these cosmetic procedures are have drawbacks like requiring fine skills and long downtime (dermabrasion), or expensive for most of the population (laser). Microneedling using dermaroller is an inexpensive safe therapeutic option for the Indian skin type with less complication. The aim of this study was to evaluate the efficacy of microneedling (dermaroller) in different types of atrophic acne scar and it's complications.

Materials and Methods: A descriptive study was performed using 30 patients with atrophic acne scar treated with microneedling for a period of two years. Details of duration, site, type and depth of acne scar along with skin types was recorded. Patients were given dermaroller treatment for 4 session, each spaced at one month interval and results assessed at the end of each session and at end of six months.

Results: In this study, 30 patients with atrophic acne scars of grade 2 and 3 were treated with microneedling therapy and efficacy and complication of this therapy were evaluated. These patients had all three types of atrophic scars- rolling, ice-pick and boxcar, these 27 patients showed 50 % improvement in their scar score at the end of the study (6 months). Among above mentioned scar types, rolling and boxcar scar showed improvement by 47.42% and 65.40% respectively at the end of the study, whereas ice-pick scars showed no significant improvement. According to the modified acne scar scoring system, 55.6% of the patients had improvement in their scar scoring between 41 and 50% (good response) and 44.4 % had improvement of more than 50 % (very good response). All patients were satisfied with the outcome of the procedure.

Conclusion: Microneedling is a safe, cost effective, innovative procedure in the treatment armamentarium of acne scars without major complications. This is found to be safe to use in Fitzpatrick type IV and V scars. However, further studies are necessary to validate these findings.

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1. Introduction

Acne vulgaris a common dermatological disorder commonly affecting the teenagers and young adults. While it may appear as a seemingly benign disorder, it

carries with it the problems of post acne scarring.¹ To add to existing woes, as acne has developed a poor reputation in the society and ignored as a legitimate disease, people delay seeking timely treatment for the post-acne sequelae.¹

Atrophic scars, which are very common, are cosmetically jarring and difficult to manage.² Until recently, there was little to offer as a solution to inflammatory acne scars

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other than Dermabrasion and Ablative lasers.² However, the outcomes with these methods are dependent heavily on the skill of the individual performing it and are seldom cost-inefficient. This not only requires multiple sittings; it also can increase the risk of scarring if done incorrectly. Moreover, a better understanding of the scar pathology has given birth to newer procedures with shorter downtime.³ As cosmetic procedures are costly, there is a need to explore treatment options, which are effective, reasonably within the reach of the vast Indian middle class and yet safe for Indian skin types.

Hence, the aim of this study was to analyze the efficacy and complications of microneedling therapy (Dermaroller) in the treatment of post acne scars.

2. Materials and Methods

This is a prospective observation study was conducted in the Department of Dermatology of Victoria and Bowring and Lady Curzon Hospitals, BMC & RI, Bangalore, between October 2009 – September 2011. 30 patients that visited the outpatient department and were found suitable for the study were recruited.

A written, informed consent was sought from all study participants. Basic demographic details, history of other associated dermatologic or systemic illnesses and general physical examination was recorded in a semi-structured pro forma.

Photographs were taken at the baseline, 2nd, 3rd and 4th sittings of treatment, and at the end of six months.

Acne scars were evaluated by a modified scoring system based on nature, depth, and size of the scars, before and after the treatment. The degree of improvement was defined as follows: No response - 0%, Weak response <15%, Fair response - 15-30% Good response- 30-50%, Very good response- 50-75% and Excellent response >75%

Those participants that were above the age of 18 with grade 2-3 post acne scars were included in the study.

Those that were on Isotretinoin in the last one year, with history of keloids, active viral/bacterial infections, evolving dermatosis, active nodulocystic lesions, pregnant and lactating women, bleeding diatheses and those on anti-coagulant medications were excluded from the study.

Patients underwent basic investigations such as Haemoglobin (%), bleeding time and clotting time.

2.1. Procedure

Patient preparation: The patient was explained about the procedure and a written informed consent was taken.

At first, the facial skin was cleaned with betadine solution and alcohol, then a topical anaesthetic (Eutectic Mixture of Local Anaesthetic) under occlusion was applied to the area to be treated and left for 60 minutes. After 1 hour of topical anaesthetic application, the area was cleaned with betadine

solution and alcohol. The area affected with acne scar was rolled with dermaroller (length of needle 1.5cm) with gentle pressure after slightly stretching the skin. It was rolled in horizontal, vertical and in diagonal directions. In each direction, it was rolled forward and backward around 20 times. The endpoint was appearance of pinpoint bleeding.

After the procedure, the area was cleaned with mild cleanser. The treated area appeared oedematous with ooze of serum.

Post procedure, an antibiotic cream was applied and the patients were advised to apply topical antibiotic cream twice daily for five days, and also advised to use moisturizers and sunscreen regularly. Patients were advised to avoid other topical applications and make-up for 3 days post procedure.

The procedure was repeated every 4 weeks for four times and every time photographs were taken before the procedure and at the end of six months. The improvement in the acne scars were assessed using the modified acne scar scoring system.

2.2. Statistical methods

For continuous data, mean and standard deviation was calculated. Student t test (two tailed, dependent) has been used to find the significance of study parameters on continuous scale within each group. A p value of less than 0.05 was considered statistically significant.

Statistical software: The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

3. Results

This study included 30 participants, comprising of males and females. The age of these patients ranged from 19 to 35 years. Maximum age groups enrolled were between 19 and 29 years. The mean age in this study was 26 years. In this study there were 20 males (66.7%) and 10 female (33.3%) patients were enrolled. Majority of the study participants were educated at the graduate level (46.7%), which would aid in better explanation of procedure and its complications. 23.3% of the participants were students, which is the most common group to be plagued by Acne vulgaris and its complications. In this study, 25 patients (83.3%) were from middle class and only 5 patients were from upper class (16.7%).

In this study, 20 patients (66.7%) had acne scars of duration 2-5 years, 6 patients (20%) had acne scars for 1-2 years and only 4 patients (13.3%) had acne scars for 5-10 years. Mean duration of acne scar in this study was 2.97 years. 19 participants in this study (63.3%) belonged to Fitzpatrick skin type IV, 8 patients (26.7%) were of skin type V and 3 patients (10%) were of skin type III.

Table 1: Skin Type

Skin Type	Number of Patients	%
III	3	10.0
IV	19	63.3
V	8	26.7
Total	30	100.0

Table 2: Evaluation of patients based on acne scar scoring

Acne scar scoring	Number of patients	Mean ± SD	Change from baseline	P value from baseline
Baseline	30	138.10±49.17	-	-
2 nd visit	30	116.70±40.75	21.40	<0.001**
3 rd visit	28	100.61±35.48	40.43	<0.001**
4 th visit	27	87.15±32.01	54.59	<0.001**
Last visit	27	72.51±25.64	69.22	<0.001**

Student test (Paired)

Table 3: Evaluation of patients on rolling scars

Rolling	Number of patients	Mean ± SD	Change from baseline	P value from baseline
Baseline	30	35.93±16.50	-	-
2nd-visit	30	28.50±12.44	7.43	0.001**
3rd-visit	28	24.78±11.19	11.54	<0.001**
4th visit	26	22.69±10.07	13.42	<0.001**
Last visit	26	19.07±8.71	17.04	<0.001**

Table 4: Evaluation of patients in ice-pick scar

ICE-PICK	Number of patients	Mean±SD	Change from baseline	P value from baseline
Baseline	30	60.70±19.44	-	-
2nd-visit	30	59.83±16.95	0.87	0.726
3rd-visit	28	59.11±13.69	2.78	0.340
4th visit	26	58.92±11.26	3.50	0.199
Last visit	26	56.54±11.31	5.88	0.100

For all the study participants, an acne scar scoring was done and recorded on every visit. The change in the acne scar scoring from the baseline value was found to be statistically significant after usage of the Dermaroller on every subsequent visit (Table 2).

For the rolling scars, the mean value of baseline score for rolling scar was 35.93±16.50, which reduced to 19.07±8.71, with an average improvement of 47.42%. This reduction was found to be statistically significant (p value <0.001).

The mean value of baseline score for ice-pick scar was 60.70±19.44, which reduced to 56.54±11.31, with an average improvement of 9.68 %. However, this was not statistically significant.

When participants were evaluated for boxcar scars, the mean baseline value was 38.10±27.62, with an average

improvement of 65.40 %, which is statistically significant (p value <0.001).

Amongst 27 patients that developed complications, it was observed that 13 patients (48.1%) developed erythema, 26 patients (96.3%) developed oedema, 7 patients (25.9%) had crusting and hyperpigmentation each, and 5 patients (18.5%) showed needle impressions. None of the patients developed post-procedure infections.



Fig. 1: Dermaroller

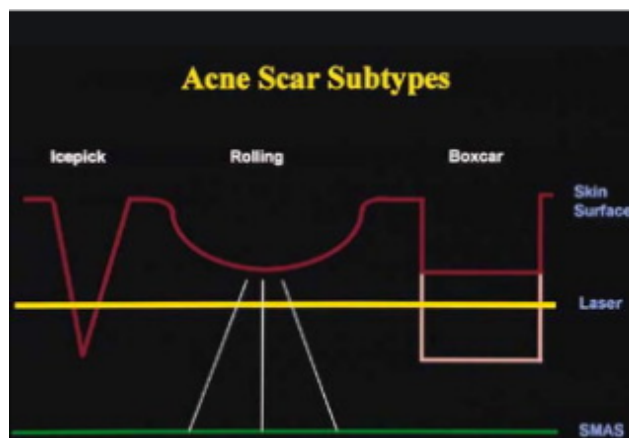


Fig. 2: Acnesar subtypes



Fig. 3: Acnescars before dermaroller treatment



Fig. 4: Acnescars after dermaroller treatment

4. Discussion

There are various treatment modalities for management of acne scars with varied results. Earlier Dermabrasion and chemical peels were most used procedures with the epidermal damage. Subcision was employed for remodeling individual acne scars by collagen induction. In recent times, microneedling has been found to be efficacious for treating multiple acne scars.

In this study, 30 patients with acne scars of grades 2 and 3 were treated with microneedling therapy and efficacy and complications of this therapy in treating acne scars was evaluated.

The mean age in this study was 26 years. This shows that young adults were aware of the cosmetic disfigurement caused by acne scars. In a study done by Ghodsi SZ et al,¹ they found the prevalence of acne in adolescents to be as high as 90%, and with some extending into early adulthood. This is associated with significant psychological and social

implications.

20 male patients (66.7 %) and 10 female patients (33.3 %) were enrolled for the study. This was comparable to the findings in a study done by Agarwal DA and team, where the male to female ratio was 1.56:1 (2:1 in this study).

Maximum patients were from middle socio-economic status (83.3%) and they were educated and working. This suggests that the microneedling procedure is affordable for many people compared to lasers. In a study done by Dreno et al.⁴ acne patients were more likely to live in urban areas with higher socio-economic status.

Majority of the patients (80%) enrolled for microneedling were unmarried which suggest that they were aware of the cosmetic disfigurement caused by the acne scars.⁵

Maximum patients enrolled in this study had acne scars of duration of 2-5 year (66.7%). This suggests delayed presentation. This could be due to social stigma, the fear of being judged by peers rather than inability of afford treatment.⁵

In this study, 19 patients (63.3%) belonged to Fitzpatrick skin type IV, 8 patients (26.7%) belonged to type V and 3 patients (10%) belonged to type III. In a study done by Semchyshyn N,⁶ it was found that majority of the patients presenting with acne scars belonged to Fitzpatrick skin type IV.

The mean value of baseline acne scar score was 138.10, which with Microneedling showed 50 % improvement in the score. In a study done by Minh PPT et al,⁷ similar findings were observed on a identical subset of patients as in this study.

When the response was graded using the modified acne scar scoring system, majority of the patients (15 patients constituting 55.6%) had improvement in the acne scar scoring between 41 and 50% (good response), whereas 12 patients (constituting 44.4%) had more than 50% (very good response) improvement in their acne scar scoring.

Overall, there was significant improvement in the rolling (47.42%) and boxcar scars (65.40%) having p value <0.001 which is clinically and statistically significant. Ice-pick scars had no significant improvement showing reduction by only 9.68%.

In a study conducted by Imran Majid,⁸ in which out of 36 patients, 26 patients showed excellent response (72.2%), 6 patients showed good response (16.7%) and 4 patients (11.1%) failed to show significant response, and also he noticed good to excellent response in rolling and boxcar scars while ice-pick showed moderate improvement. In his study, he did not observe any significant complications.

4.1. Subjective improvement

In this study, 77.8% of patients reported 41 to 50% improvement at the end of last visit and rest of the patients had less than 40% improvement. This was similar to

findings in the study done in Vietnamese patients by Minh PTT and team,⁷ as they found significant patient satisfaction post procedure.

4.2. Complications

The most common complication seen in this study was edema of the treated area seen in 26 patients (96.3%), followed by erythema, observed in 13 patients (48.1%). Crusting and hyperpigmentation was seen in 7 patients (25.9%) each. Needle impressions were seen only in few patients (18.5%). None of the patients developed infection. This was comparable to the findings in a study by Minh PTT et al,⁷ where they found erythema to be the most common complications with no pustule formation.

5. Conclusion

According to the modified acne scar scoring system, 55.6% of the patients had improvement in their scar scoring between 41 and 50% (good response) and 44.4 % had improvement of more than 50 % (very good response). All the participants enrolled in the study were satisfied with the outcome of the procedure.

Microneedling was not associated with any major complications, however hyperpigmentation was seen in few patients and resolved after regular sunscreen application, and hence this procedure is safe to use in Fitzpatrick skin type IV and V.

Microneedling is a safe, cost effective, innovative procedure in the treatment armamentarium of acne scars without major complications.

6. Source of Funding

No external funding was received to carry out this work.

7. Conflict of Interest

None declared.

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Cite this article: Leelavathy B, Lalitha C, Shwetha S. Efficacy and outcome of Microneedling (Dermaroller) in post-acne scars. *IP Indian J Clin Exp Dermatol* 2021;7(3):256-260.