

## ASSESSMENT OF MICRONEEDLING THERAPY IN THE MANAGEMENT OF ATROPHIC FACIAL ACNE SCARS

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### ABSTRACT

#### STUDY BACKGROUND

Post acne scars are always a challenge to treat, especially the ones which are deep seated. There are many treatment options like laser resurfacing, dermabrasion, microdermabrasion and non-ablative laser resurfacing but with considerable morbidity and interference with the daily activities of the patient in the post-treatment period. Microneedling or dermaroller therapy is one of the new treatment options in the management of acne scars with satisfactory improvement and no significant side effect. The aim of the present study is to perform an objective evaluation the efficacy of microneedling in the treatment of atrophic acne scars.

#### MATERIALS AND METHODS

Thirty patients of skin type III-V having atrophic facial acne scars presenting to our dermatology OPD. were received multiple sittings of microneedling (dermaroller) treatment with an interval of 6 weeks between each session. Goodman & Baron's acne scar grading system was used for assessment of their scars and was evaluated clinically by serial photography at the start as well as at two months after the conclusion of the treatment. Patients on anticoagulant therapy, of keloidal tendency, with bleeding disorders, vitiligo patients, pregnant and lactating mothers and patients with active acne lesions were excluded from the study. The duration of this study was for ten months-from January 2014 to October 2014.

#### RESULTS

Any change in the grading of scars after the end of treatment and follow-up period was noted down. The efficacy and improvement of dermaroller treatment was assessed by Goodman and Baron's Global Acne Scarring System. Out of 30 patients, 26(80.64%) patients achieved a reduction in the severity of their scarring by one or two grades. Quantitative assessment showed that 13.3% of patients had minimal, 16.6% had good and 70% showed very good improvement. Adverse effects were limited to transient pain, erythema and edema.

#### CONCLUSION

Microneedling therapy seems to be simple and efficacious for the management of atrophic facial acne scars.

#### KEYWORDS

Atrophic Acne Scars, Microneedling, Dermaroller, Therapeutic Results.

**HOW TO CITE THIS ARTICLE:** Pandey A, Swain J P, Minj A. Assessment of microneedling therapy in the management of atrophic facial acne scars. *J Evid Based Med Healthc* 2015; 2(57), 8911-13. DOI: 10.18410/jebmh/2015/1256

**INTRODUCTION:** Post-acne facial scarring is a very psychologically distressing phenomenon and the affected patient invariably suffers from low self-esteem.<sup>1</sup> Facial scarring has always been a challenge to treat and there are different treatment options for the management of these scars. Treatment options like laser resurfacing or dermabrasion that offer significant improvement in facial scars are invariably associated with considerable morbidity and interference with the daily activities of the patient in the

post-treatment period.<sup>2</sup> On the other hand, treatments like microdermabrasion and non-ablative resurfacing with lasers do not show the same level of efficacy as the traditional, ablative resurfacing techniques.<sup>3</sup> New treatments and techniques such as dermaroller or microneedling therapy are being added over the last few years to overcome these limitations.<sup>4</sup> There are some clinical studies in the world literature that have documented a favourable clinical and histopathological response in the skin after dermaroller treatment.<sup>5</sup> Post-acne facial scars have been classified into many morphological types and the ideal treatment option depends upon the type of scarring. A simple clinical grading system proposed by Goodman and Baron<sup>6</sup> is used to grade the severity of post-acne facial scars (Table 1). The present study is aimed to ascertain the efficacy of dermaroller treatment in the management of atrophic facial acne scars.

Submission 09-12-2015, Peer Review 11-12-2015,  
Acceptance 14-12-2015, Published 17-12-2015.

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Grade 1	Macular erythematous, hypo or hyperpigmented scars
Grade 2	Mild atrophy not obvious at social distances of >50 cm or easily covered by facial makeup or beard hair
Grade 3	Moderate atrophy obvious at social distances of >50 cm; not easily covered by makeup or beard hair, but able to be flattened by manual stretching
Grade 4	Severe atrophy not flattened by manual stretching of skin

**Table 1: Grading of atrophic scars as per Goodman and Baron's acne scar grading system**

**MATERIALS AND METHODS:** The present study was performed on 30 patients having facial atrophic acne scars between January 2014 and October 2014. Before starting the therapy, the patients were photographed and assessed clinically to grade the severity of scarring, proposed by Goodman and Baron.<sup>7</sup> Only patients with Grade 2 to Grade 4 atrophic scarring were enrolled for the study. None of the patients had received any previous treatment for their acne scars. Presence of any active infection, active acne on the face or a keloidal tendency in the patient, vitiligo patients, pregnant and lactating mothers were excluded from the study. Informed written consent was obtained from all the patients who were enrolled for the study. Microneedling or dermaroller treatment was performed with an interval of 6 weeks between each session. Patients had undergone four sessions of microneedling therapy for their acne scars. The area of treatment was anaesthetized 45-60 minutes before the procedure with standard topical anaesthetics (eutectic mixture of prilocaine and lignocaine) under aseptic precautions.

Dermaroller with 1.5mm long needles were used and the endpoint for any treatment session was indicated by the presence of uniform bleeding points over the treated area. Four rolls in each direction over the area of treatment were performed with light to medium pressure on the skin. Post-procedure pain was managed by oral non-steroidal anti-inflammatory drugs (NSAIDs) and tablet azithromycin 500mg o.d. for three days. Patients were advised topical antibiotic application for three days and strict sun protection for at least a week after each dermaroller treatment.

After the procedure, the patients were followed up monthly for the next three months. The final assessment and grading of scars was done at the end of two months. Repeat photographs were then taken and compared with that in the pre-treatment period and any change in the grading of scars was noted.

On objective lines, an improvement of scarring by two grades or more was labelled as 'excellent' response while a 'good' response meant an improvement by a single grade only. In those patients where the scar grading remained the same after the completion of treatment in the facial scarring the response was labelled as 'poor'.

**RESULTS:** Among the 30 patients, there were 20 females and 10 males in our study group. The age of the patients ranged from 15 to 32 years; the youngest patient was a female aged 15 years and the oldest patient was a male of 32 years age with mild to severe post-acne scarring. All patients completed the study, including the 3-month follow-ups. Most patients had mixed types of atrophic acne scars including ice pick, boxcar and rolling scars. All patients tolerated the procedure well except for a temporary erythema and pain. After 2 days of dermaroller sitting, the patients were able to attend their daily activities.

Out of 30 patients, 5 patients had Grade 4, 17 patients had Grade 3 and 8 patients had Grade 2 scarring before treatment. Estimation of improvement with Goodman and Baron's Global qualitative Acne Scarring System was done. The physician's assessment of response to treatment based on Goodman and Baron Qualitative scar grading system is summarised in Table 2.

Grade of Scars	No. of Patients	Excellent Response	Good Response	Poor Response
Grade 4	5	1=20%	2=40%	2=40%
Grade 3	17	12=70.5%	3=17.6%	2=11.7%
Grade 2	8	8=100%	0=0	0=0
<b>Total</b>	<b>30</b>	<b>21=70%</b>	<b>5=16.6%</b>	<b>4=13.3%</b>

**Table 2: Response to dermaroller treatment based on Goodman and Baron's qualitative acne scar grading**

In patients with Grade 2 scars, all eight showed an excellent response to treatment. Out of seventeen patients with Grade 3 scars, 12 patients (70.5%) improved by 2 grades (reduction to Grade 1 or less) with excellent response; 3 patients achieved a good response while 2 patients had a poor response to treatment. In patients with grade 4 scars, only one patient improved by 2 grades or more with excellent result, 2 patients had good response and 2 patients had poor response.

Thus, overall the study showed that, out of 30 patients 70% (21 numbers) showed an excellent response to dermaroller treatment [Figures 1 and 2] while five others achieved a good response (16.6%). Only four patients (13.3%) failed to show a significant response to treatment. In respect to morphological type of scarring, rolling and box scars showed better response than ice-pick or pitted scars.

Correlating the response rate with the grade of scarring present, an excellent response rate was observed in the majority of patients with Grade 2 and 3 scarring. However, because of only a few patients with Grade 4 scars in the present study, the comparative results could not be considered for their statistical significance.



**Fig. 1**

**Fig. 2**

**DISCUSSION:** Acne scarring occurs subsequent to visible resolution of deep inflammation and the most common type is the atrophic acne scars. Scarring may occur regardless of the severity of acne.<sup>8</sup> The major clinical types of atrophic scars are ice pick, rolling or superficial, and boxcar or depressed fibrotic scars. Choice of treatment of post-acne scars depends both on the morphological type as well as the severity of scar present on the face.<sup>9</sup> Ablative lasers such as CO<sub>2</sub> and Er:YAG laser have efficacy of 30-90% for treatment of acne scars but are associated with erythema for more than 3 months, dyspigmentation and scarring.<sup>10</sup> Non-ablative lasers such as Nd:YAG and diode lasers have an efficacy of 40-50%, but effect only on shallow box scars with no significant epidermal improvement.<sup>11</sup> Depending upon the severity of the scarring, post-acne scars are graded into four different grades regardless of the individual morphology of the scars.<sup>6</sup>

In last few years microneedling therapy also called dermaroller, is being used for managing post-acne scars. The treatment is performed as an outdoor procedure after application of a local anaesthetic cream. The aim of this process is to stimulate collagen production by injuring the skin through hundreds of punctures. This leads to the thickening of the skin and smoothing of wrinkles and scars.<sup>5</sup> The roller leaves the epidermal barrier fully intact, and the micro-channels created by the needles of dermaroller fully close within just a few hours after initial application. This microneedle dermaroller provides just enough time for new collagen structures to form within the skin's lower layers.<sup>4,12</sup> Treatment with dermaroller is performed at four to eight week intervals and multiple sittings are needed to achieve the desired effect on the skin.<sup>12</sup>

We have analyzed the efficacy of dermaroller, both in different types of scars and different grades of scars. Excellent response was seen in rolling or boxcar scars, while moderate response was seen in pitted scars. Thus on an overall basis, a good to excellent response was achieved in 86.6% cases. Our study showed similar result with Majid I.<sup>12</sup> who also had more than 80% 'excellent' efficacy. In his study, 34 out of the total of 37 patients achieved a reduction in the severity of their scarring by one or two grades with no significant adverse effects in any patient.<sup>12</sup>

**CONCLUSION:** Dermaroller treatment thus has definite advantages because of its cheaper cost, simple easy procedure, minimal downtime associated with it and lack of any significant adverse effects.

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