

# A study of skin resurfacing for atrophic acne scars by skin needling with dermaroller

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## Abstract

**Background:** The prevalence of acne scarring in general population is reported from 1% to 11%. The acne scars cause a significant emotional distress in adolescent and the young. The commonest acne scars are atrophic scars. Skin resurfacing for atrophic acne scars with fractional laser is costly and causes complication of dyspigmentation in the dark skin. Skin resurfacing for atrophic acne scars by skin needling is reported to give good result with minimal complications. Skin needling is a minimally invasive, well tolerated, simple office procedure. It appears to be a low cost alternative for correction of atrophic acne scars. **Objective:** To study efficacy of skin resurfacing for atrophic acne scars by skin needling with the dermaroller. **Material and Methods:** The study was carried out on 35 patients of atrophic acne scars at a general hospital in Lucknow. Fitzpatrick skin phototype and grade of scarring of the patient was evaluated on the four scale grading system of Goodman and Baron before treatment and after skin needling with the dermaroller. **Results:** Improvement in atrophic acne scar was good or excellent in 100% patients of Grade 1, 75% of Grade 2, 73.3% of Grade 3 and 42.8% patients of Grade 4 scarring ( $p < 0.001$ ). **Conclusions:** Skin needling results into excellent or good skin resurfacing in a majority of patients with Grade 1 to Grade 3 acne scarring. No post inflammatory hyperpigmentation (PIH) or other complications occur.

**Keywords:** Atrophic acne scar, grade of scarring, four scale grading system, skin needling, dermaroller.

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## INTRODUCTION

Acne scarring, a permanent complication of acne vulgaris, is reported to occur in 95% of patients of acne vulgaris.<sup>[1]</sup> The scars occur in adolescence and the early youth and cause a significant emotional distress to the affected. Acne, along with acne scar, is a risk factor for suicide and is linked to poor self-esteem, anxiety, depression, body image alterations, altered social interactions, lowered academic performance and unemployment.<sup>2</sup> Atrophic acne scars are the commonest acne scars. Skin resurfacing is done in mild to moderate acne scars by fractional laser and in deeper scars by

ablative laser and dermabrasion. Skin resurfacing in atrophic acne scars can be carried out by less invasive procedures such as skin needling, chemical peels, punch elevation and punch excision.<sup>3,4</sup> Skin needling is also called “collagen induction therapy”<sup>5</sup> or “needle dermabrasion.”<sup>6</sup> It is the technique of rolling on the skin, a small handy device called dermaroller which is composed of a barrel studded with hundreds of micro-needles. On rolling the dermaroller on the surface of the skin, it creates thousands of micro punctures to the level of papillary or mid dermis. Atrophic acne scars such as rolling scars, superficial boxcar scars or macular scars treated by fractional laser are reported to improve well with skin needling.<sup>5,6,7,8</sup> Skin needling is safe in all skin phototypes and carries the lowest risk of post inflammatory hyperpigmentation (PIH) as compared to chemical peels, laser and dermabrasion.<sup>7</sup> Specific areas of scarring can be treated, without the need to treat the entire face or “feather” at the treatment edges and the recovery period is significantly shorter than laser skin resurfacing or dermabrasion.<sup>[8]</sup> It is a simple office procedure and can be incorporated in dermatologic practice more easily as compared to fractional laser, laser resurfacing or dermabrasion. The aim was to study efficacy and

complications of skin resurfacing for atrophic acne scars by skin needling with the dermaroller.

**MATERIAL AND METHODS**

A prospective study was carried out in the Dermatology outpatient department (OPD) of a medical college hospital at Lucknow, Uttar Pradesh, with due permission of the Institutional Ethics Committee. A total of 35 patients of atrophic acne scar, of either gender in the age group 18 to 45 years were selected for the study. Patients with active acne lesions or under treatment for acne and those with keloidal tendencies were excluded from the study. Subjects were explained nature of the treatment and an informed written consent was obtained from them. The data of patients was recorded in a predesigned case record form which included Fitzpatrick skin phototype and grade of scarring on the four scale grading system of Goodman and Baron. Early local changes in the skin following skin needling and adverse effects due to the procedure were recorded. The identity of the patient was kept confidential.

**Procedure**

The area to be treated was cleansed and a topical anesthetic under occlusion was applied for at least one hour before the procedure of skin needling with a dermaroller. (Fig. 1)



Figure 1: Dermaroller: Barrel studded with micro-needles

A sterile dermaroller studded with 192 micro-needles, 1.5 mm x 0.25mm, was rolled across the affected area with uniform pressure, four times in four different directions, for a total of 16 passes. The area demonstrated uniform pinpoint bleeding. The treatment was given once every 3 weeks for a total of 4 sessions and subsequently the subjects were followed up for a further period of 3 months. Photo-protection was advised to all subjects.

**Evaluation of scars**

The evaluation of scars was carried out separately by the physician and the patient before skin needling procedure and after 6 months of initiating the treatment. The physician recorded the grade of acne scarring as per four scale grading system of Goodman and Baron (Table 1).<sup>9</sup>

Table 1: Qualitative Global Acne Scarring Classification of Goodman CJ and Baron JA.<sup>9</sup>

Grade of Scarring	Level of disease	Clinical features
1	Macular	Erythematous, hypo or hyperpigmented flat marks visible to patients and observer irrespective of distance
2	Mild	Mild atrophy or hypertrophy that may be obvious at social distance of 50 cm or greater and may be covered easily by makeup. Moderate atrophic or hypertrophic scar that may be obvious at social distance of 50 cm or greater and not covered easily by makeup but still able to be flattened by manual stretching of skin.
3	Moderate	Severe atrophic or hypertrophic scar that may be obvious at social distance of 50 cm or greater and not covered easily by makeup and not able to be flattened by manual stretching of skin.
4	Severe	

To evaluate grade of the acne scarring, scars were visually inspected, palpated and stretched so as to distinguish between grade 3 and grade 4 scarring. After 6 months of skin needling an improvement in grade of the scarring by two or more grades was labeled as *excellent* response, an improvement by a single grade was labeled as *good* response and no change in grade of scarring was labeled as *poor* response. Patient evaluated improvement in grade of the scarring by using a ten point visual scale and level of the improvement was graded as *excellent* (score > 7), *good* (score 4 – 7) or *poor* (for a score < 4).

**Statistical analysis**

SPSS (Statistical Package for Social Sciences) Version 17.0 was used for statistical analysis. The values were represented in number (%). Chi square test of proportion and association was used for test of the equality of proportion and relationship between the two attributes. Non parametric Wilcoxon signed rank test was used for the test of change of grade before and after the treatment.

**OBSERVATIONS AND RESULTS**

A total of 31 out of 35 patients registered for the study, completed the study.

Table 2: Age and gender distribution

		Number of patients n = 31
Age	≤ 20 Yrs	3 (9.7%)
	21-30 Yrs	25 (80.6%)
	>30 Yrs	3 (9.7%)
Gender	Male	9 (29.0%)
	Female	22 (71.0%)

The age of patient varied from 19 years to 36 yrs; 25 (80.6%) were between 21 to 30 years of age. Male to female ratio was 1:2.44. Mean age of patients was 25.45 years.

**Table 3: Fitzpatrick skin phototype and duration of scars**

Number of patients n = 31	
<b>Fitzpatrick skin phototype</b>	
IV	13 (41.9 %)
V	18 (58.1%)
<b>Duration of scars</b>	
<5 Yrs	14 (45.2%)
5-10 Yrs	12 (38.7%)
>10 Yrs	5 (16.1%)

'p' value for skin phototype is 0.52, and for duration of scars is 0.355

All patients belonged to Fitzpatrick skin phototype IV and V. Duration of scars was less than 5 years in 52.4%.

**Table 4: Qualitative Global Acne Scarring Grade before skin needling and 6 months after skin needling.**

No. of patients (n=31)	Grade of the scar before skin needling	Number of patients in various grades of scarring 6 months after skin needling				
		Complete resolution	Grade 1	Grade 2	Grade 3	Grade 4
1 (3.2%)	1	1	0	0	0	0
8 (25.8%)	2	0	6	2	0	0
15 (48.4%)	3	0	11	2	2	0
7 (22.6%)	4	0	2	1	0	4

Statistical significance of change: z=4.30; p<0.001(Highly significant) WSR\*, \*WSR = Wilcoxon signed rank test.

An assessment of the grade of scarring of subjects before skin needling and 6 months after skin needling was done using "Qualitative Global Acne Scarring Grade" of Goodman and Baron. Before skin needling 30/31 (96.8%) subjects revealed Grade 2 to Grade 4 scarring. Following skin needling 6/8 (75%) Grade 2 scarring patients improved to Grade 1, 11/15 (73.3%) Grade 3 scarring patients improved to Grade 1 and 2/7 (28.6%) Grade 4 scarring patients improved to Grade 1. An assessment of grading of scarring by the physician 6 months after skin needling revealed an excellent response in 14 (45.2%), good in 9 (29%) and poor in 8 (25.8%) patients. The improvement in grade of scarring was statistically highly significant (p<0.001).

**Table 5: Physician's and Patient's Evaluation of level of improvement in the scarring.**

Evaluation of improvement Physician	Evaluation of improvement Patient	Level of improvement in the scarring
14 (45.2%)	15 (48.4%)	Excellent
9 (29.0%)	9 (29.0%)	Good
8 (25.8%)	7 (22.6%)	Poor

Physician's evaluation:  $\chi^2=8.790$ ; \*p=0.012 (highly significant) Chi square test Patient's evaluation:  $\chi^2=8.742$ ; p=0.013(highly significant) Chi square test. Physician's evaluation using a four scale qualitative grading of Goodman and Baron, revealed excellent or good response in 74.2% of patients. Patient's evaluation using a ten point visual scale revealed excellent or good response in 77.2 %. Short-term effects such as edema, erythema and transient hyperpigmentation after the procedure of skin needling were observed as following:

**Table 6: Short-term effects after the procedure of skin needling with dermaroller**

Sr. No.	Effects	Number of patients (n=31)	Statistical significance $\chi^2$ p
1	Edema	8 (25.8%)	9.459* 0.002*
2	Erythema	6 (19.4%)	1.176 0.278
3	Transient hyperpigmentation	6 (19.4%)	0.152 0.697

\* Highly significant

Transient edema, erythema and hyperpigmentation were seen in 25.8%, 19.4% and 19.4% cases respectively. Secondary infection or post inflammatory hyperpigmentation (PIH) was not seen in any case.



Figure 2

Figure 3

**Legend**

**Figure 2:** Grade 3 scarring – before treatment with dermaroller; **Figure 3:** Grade 1 scarring, 24 weeks after treatment with dermaroller

Before skin needling 15/31 patients (48.4%) had grade 3 scarring. At the end of the study 30/31 patients (96.8%) were in grade 1 scarring. An improvement in grade 3 scarring from baseline to grade 1 (Fig. 1 and Fig. 2) was seen in 11 patients.

**DISCUSSION**

Skin needling by dermaroller is a minimally invasive office procedure for skin resurfacing of atrophic acne scars. The optimal scars to treat with skin needling are same as that of fractional laser i.e. rolling acne scars, superficial boxcar scars and erythematous or hypopigmented macular (grade 1) scars.<sup>13</sup> In the present study, the outcome of the treatment for atrophic acne scars 6 months after skin needling was assessed using the change in four scale grading system of Goodman and Baron.<sup>[9]</sup> On correlating the improvement in various grades of scarring it was observed that there was *excellent or good* improvement in 100% of patients with grade 1 scarring, 75% with grade 2 scarring, and 73.3% with grade 3 scarring and 42.8% patients with grade 4 scarring. Hence *excellent or good* response was observed in a majority (more than 70%) of patients with grade 1, 2 and 3 atrophic acne scarring and *moderate* response was observed in grade 4 scarring (Fig. 2 and Fig. 3). Our observations are similar to that of Imran Majid who reported good to excellent response in 88.7% patients and excellent result in majority of patients of grade 2 and grade 3 atrophic acne scars and poor response in majority of patients with grade 4 scars.<sup>10</sup> Following the procedure, transient local edema, erythema and hyperpigmentation appeared in 25.8%, 19.3% and 19.3% of patients respectively. The findings are similar to the study by Dogra S *et al*, where hyperpigmentation was observed in 16.6% of patients.<sup>12</sup> Post inflammatory hyperpigmentation (PIH) was not seen in any of the patients in the present study. Aesthetic improvement in the scarring was observed after 2 sessions as was also reported by G. Fabbrocini *et al*. The beneficial effect of

skin needling is visible by about 6 weeks and the improvement continues for a period of 12 months with further reduction in the depth of scars.<sup>11</sup> Patients observed additional aesthetic benefits in the form of skin rejuvenation, reduced fine lines, pores and freckles, improved skin color and the texture. In the present study patient satisfaction was 77.4% which is similar to the observation by Dogra S *et al*.<sup>12</sup> Resurfacing procedures remove layers of skin from the top down. Injury to the dermis by resurfacing procedures is thought to cause dermal remodeling and neocollagenesis. The proposed mechanism by which skin needling improves acne scars is as follows: the dermal vessels are wounded, causing a cascade of events including platelet aggregation, release of inflammatory mediators, neutrophil, monocyte and fibroblast migration, production and modulation of extracellular matrix, collagen production and prolonged tissue modulation causing continued skin remodeling.<sup>13</sup>

**CONCLUSION**

Skin resurfacing in atrophic acne scars by skin needling by dermaroller is a simple, well tolerated, low cost and efficacious office procedure. It gives excellent or good improvement in a majority of patients with grade 1, 2 and 3 scarring. Improvement in aesthetic appearance of the scarring is visible in about 6 weeks of the treatment. Post inflammatory hyperpigmentation (PIH) or other complications are not seen even in Fitzpatrick skin phototype IV and V. Patient satisfaction is excellent.

**REFERENCES**

1. Layton AM, Henderson CA, Cunliffe WJ. A clinical evaluation of acne scarring and its incidence. *Clin Exp Dermatol.* 1994;19:303–308.
2. Fife D. Practical evaluation and management of atrophic acne scars: tips for the general dermatologist. *J Clin AesthetDermatol.* 2011;4:50–57
3. Goodman GJ, Baron JA. Postacne scarring: a quantitative global scarring grading system. *Journal of Cosmetic Dermatology.* 2006; 5 (1):48-52.

4. Tahiliani ST, Rais S. Management of acne scars. In : Sacchidanand S (Editor in chief). IADVL Textbook of Dermatology 4<sup>th</sup> ed Mumbai, India: Bhalani Publishing House; 2015; pp2467-2472.
5. Aust MC, Fernandes D, Kolokythas P, Kaplan HM, Vogt PM. Percutaneous collagen induction therapy: an alternative treatment for scars, wrinkles, and skin laxity. *Plast Reconstr Surg.* 2008;121 (4):1421–1429.
6. Camirand A, Doucet J. Needle dermabrasion. *Aesthetic Plast Surg.* 1997;21 (1):48–51.
7. Fabbrocini G, Annunziata MC, D'Arco V, et al. Acne scars: pathogenesis, classification and treatment. *Dermatol Res Pract.* 2010;2010:893080. Epub 2010 Oct 14.
8. Puri N. Comparative study of dermaroller therapy versus trichloroacetic acid CROSS for the treatment of atrophic acne scars. *J Pak Assoc Dermatol.* 2015; 15:114–8.
9. Goodman GJ, Baron JA. Postacne scarring: a qualitative global scarring grading system. *Dermatologic Surgery.* 2006; 32(12):1458-1466.
10. Majid Imran, Microneedling Therapy In Atrophic Scar: An objective Assessment. *J Cutan Aesthet Surg.* 2009 Jan-Jun; 2 (1): 26-30.
11. Fabbrocini G, Fardella N, Monfrecola A, Proietti I, Innocenzi D. Acne scarring treatment using skin needling. *Clinical and Experimental Dermatology.* 2009; 34 (8): 874-879.
12. Dogra S, Yadav S, Sarangal R. Microneedling for acne scars in Asian skin type: an effective low cost treatment modality. *Journal of Cosmetic Dermatology,* 2014 Sep; 13(3):180-7. Doi: 10.1111/jocd.12095
13. Fife D. Practical evaluation and management of atrophic acne scars: tips for the general dermatologist. *J Clin Aesthet Dermatol.* Aug 2011;4(8):50–57.

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