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Original Research Article

Efficacy of dermaroller on morphology of acne scars: analytical and prospective study

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ABSTRACT

Background: Atrophic acne scars cause psychological devastation and are difficult to treat. The demand for less invasive but highly effective treatment for scars is growing. Objective was to assess the efficacy of microneedling in the management of atrophic acne scars on the basis of morphology.
Methods: Fifty one patients with atrophic acne scars were selected. Each patient was evaluated for types of acne scars. Dermaroller was performed at 4 weeks interval for a total of 3 sessions. Evaluation of type of acne scar and photography were done pre-treatment and 6 months after the end of treatment. Patients own evaluation of improvement was assessed by patient perception scale.
Results: At the end of treatment, boxcar scars reduced by 47.06%, rolling scars reduced by 37.25% and 05.88% reduction was seen in ice pick scars. No treatment failure was seen. There was high level of patient satisfaction with patient perception scale of 8.15.
Conclusions: Dermaroller has shown good results in treating boxcar and rolling scars with little effect on ice pick scars.

Keywords: Atrophic acne scars, Acne scars, Dermaroller, Microneedling

INTRODUCTION

Acne is prevalent in over 90% adolescents and it persists into adulthood in approximately 12%-14% of cases.[1,2] Post-acne facial scarring is a psychologically devastating condition and the affected patient suffers from many psychological ill-effects.[3] Hypertrophic scars and keloids are examples of scars that result from increased tissue formation. Scars with loss or damage of tissue are atrophic acne scars and can be classified into ice pick, rolling and boxcar scars.[4] There is no standard treatment option for the treatment of acne scars. Medical management of atrophic scars can be done by using topical retinoids. Surgical management can be done using punch excision, elliptical excision, punch elevation, skin grafting and subcision depending on the type of scar. Procedural management includes microdermabrasion, chemical peels, percutaneous collagen induction by microneedling and dermabrasion. Tissue augmentation can be done using xenografts, autografts and homografts. Various ablative and nonablative lasers and light energies are also available for treatment of atrophic acne scars.[5] Out of these multiple treatment options, treatment has to be tailored to patient's needs, tolerance, and goals along with the physician's assessment, skills and expectation, one such modality is microneedling therapy.[6] The

mechanism hypothesised for action of percutaneous collagen induction using dermaroller is that it creates thousands of microclefts through the epidermis into the papillary dermis. These wounds create a confluent zone of superficial injury which initiates the normal process of wound healing with release of several growth factors. This stimulates the migration and proliferation of fibroblasts resulting in collagen deposition which continues for months after the injury.[7] Another hypotheses states that on penetration of skin with the microneedles, the cells react with a demarcation current which in addition to the needles own electrical potential results in release of various growth factors. This cuts short the healing process and stimulates the healing phase.[8] This study was conducted to assess efficacy of dermaroller in various types of acne scars with long term follow up.

METHODS

A prospective study was conducted in Department of Dermatology, Venereology and Leprosy at a tertiary hospital in east India. Institutional ethical committee clearance was taken.

Fifty one patients with atrophic acne scars were enrolled in the study duration of 15th September, 2015 till 14th March, 2016 depending on the inclusion and exclusion criteria.

Exclusion criteria were patients with active acne, active infection, evidence or history of keloid scars, pregnancy or lactation, history of any facial surgery or procedure for scars in last 3 months and patients with unrealistic expectations. All the patients were counselled for surgical intervention and written informed consent was taken.

Investigations in the form of complete blood count, bleeding and clotting time, fasting blood sugar, HbsAg, HIV tests were done. They were photographed digitally and assessed clinically for the morphology of the scarring, by the non-treating physician. Patient's skin was primed using topical tretinoin cream 0.05% at night along with sunscreen with a minimum SPF of 30 during the day for 2 weeks prior to starting the treatment. Dermaroller treatment was performed at monthly interval for three sittings. Area of interest was anesthetized using a thick application of topical anesthetic cream (eutectic mixture of prilocaine and lignocaine), about 30-45 min before the procedure. Rolling was done 15-20 times in horizontal, vertical, and oblique directions. Skin was stretched in a perpendicular direction to the dermaroller movement so that the base of the scars could be reached. The endpoint was the presence of uniform bleeding points over the scarred area and then the area was wetted with saline pads. After the end of the treatment regimen, the scars were again assessed by the evaluator, and the patient was followed up monthly for the next six months. The final assessment was done at the end of six months of follow-up and repeat photographs were taken. The appearance of scars was compared with that in the pre-treatment period and any change in the appearance of scars was noted.

Patients' own evaluation based on patient scar improvement perception scale of 1-10 was taken into account. Rating ≥7 was graded as 'excellent response', rating between 4 and 6 as 'good response' and rating below 4 meant a 'poor response'.

Adverse effects in the immediate post-treatment example pain, erythema, post inflammatory hyper-pigmentation, any interference with their daily activities were noted. Post procedure, patients were advised sunscreen, topical antibiotic application for two to three days.

Statistical analysis

Descriptive statistics such as mean was calculated. Data is presented in frequencies and their respective percentages. Data was entered and analysed using SPSS version 18.

RESULTS

Out of the total 51 patients, 23 (45.10%) were male and 28 (54.90%) were female. Mean age of patients was 20.59 years. Mean duration of scars in these patients was 13.14 months. At enrolment, on the basis of morphology of scars, 28 (54.90%) patients had ice pick scars, 38 (76.47%) had rolling and 30 (58.82%) had boxcar. At the end of treatment, morphology of scars was as follows: 49.02% patients had ice pick, 39.22% patients had rolling and 11.76% patients had boxcar scars (Table 1). There was no treatment failure seen.

Table 1: Morphology of acne scars before and at the end of treatment.

S. no	Parameter	% of patients at start of treatment	% of patients at end of treatment	% decrease with treatment
1.	Ice pick	54.90	49.02	05.88
2.	Rolling	76.47	39.22	37.25
3.	Boxcar	58.82	11.76	47.06

The patient perception scale (PPS) graded from 1 to 10, showed a mean PPS of 8.15 which means excellent response.

One of the adverse effects noted was pain. Mean duration of which was 2.96 hours in 1st sitting and it subsequently decreased to 1.90 hours in 2nd and 1.61 hours in 3rd sitting. Second adverse effect noted was erythema. Mean duration of erythema was 2.41 days, 1.69 days and 1.49 days in 1st, 2nd and 3rd sitting respectively.

Percentage of patients developing post inflammatory hyper-pigmentation were 9.80% in 1st and second sitting

and it decreased to 7.84% in 3rd sitting, which was managed by sunscreen in the morning and using combination of tretinoin, hydroquinone and fluocinolone at night for average duration of 1.5 months. Mean working days lost were 1.84 days in 1st sitting, 1.37 days in second sitting and 1.29 days in 3rd sitting (Table 2). Post-peel exfoliation of skin was present from 2 to 6 days with a mean of 3±1 day.

Table 2: Adverse effects in various sittings.

Parameter	1st sitting	2nd sitting	3rd sitting
Mean duration of pain (in hours)	2.96	1.90	1.61
Mean duration of erythema (in days)	2.41	1.69	1.49
% developing post inflammatory hyperpigmentation	9.80	9.80	7.84
Mean of working days lost (in days)	1.84	1.37	1.29

Figure 1: At the time of presentation.

Figure 2: At the end of follow up of 6 months, showing excellent result, only few ice pick scars are left.

DISCUSSION

Dermaroller therapy is a recent addition to the treatment armamentarium for managing post acne scars.

On basis of scar morphology, at the end of treatment 49.02% patients had ice pick, 39.22% patients had rolling and 11.76% patients had boxcar. So in our study we found that the response was better in rolling and boxcar as compared to ice pick scar. It was comparable with study by Majid, who also found an excellent response in rolling and boxcar while pitted scars showed only moderate improvement.[9]

Patient perception scale (PPS) graded from 1 to 10 showed a mean PPS of 8.15, which shows overall excellent level of patient satisfaction.

Mean duration of pain was 2.96 hours in 1st sitting and it subsequently decreased to 1.90 hours in 2nd and 1.61 hours in 3rd sitting. Mean duration of erythema was 2.41 days, 1.69 days and 1.49 days in 1st, 2nd and 3rd sitting respectively. Percentage of patients developing Post inflammatory hyper-pigmentation were 9.80% in 1st and second sitting and it decreased to 7.84% in 3rd sitting. Mean working days lost were 1.84 days in 1st sitting, 1.37 days in second sitting and 1.29 days in 3rd sitting. Side effect profile was comparable with study by Garg et al, who found post-dermaroller transient erythema and oedema lasted for a mean of 2.4±0.7 days and 3 patients (6%) developed post-inflammatory hyper-pigmentation (PIH).[10] Overall it gives an impression that all the side effects were less in subsequent sitting as compared to the first time procedure, which may be attributed to better tolerability of the procedure in subsequent sittings. Procedural downtime is also less. Post inflammatory hyperpigmentation could be easily managed.

There are certain advantages with dermaroller therapy over laser resurfacing; former does not lead to any epidermal injury as is seen with lasers, there is minimal downtime associated with the procedure unlike ablative laser resurfacing and the treatment is far cheaper as compared to lasers. The treatment can be performed in an office setting and does not need any extensive special training or expensive instruments.

It is effective in all types of atrophic acne scars with no failure rate. The procedure was well tolerated by all the patients and side effects were mild and transient. There is a high level of patient satisfaction, minimal downtime and the treatment is cost-effective to the patient. Also the improvement in the grade of scars was sustained in the follow-up period of 6 months. To our knowledge, this is the first study on efficacy of dermaroller (in morphology of acne scars) in the management of atrophic acne scars with large sample size and long term follow up.

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REFERENCES

1. Ghodsi SZ, Orawa H, Zouboulis CC. Prevalence, severity, and severity risk factors of acne in high school pupils: A community-based study. J Invest Dermatol. 2009;129:2136–41.
2. Williams C, Layton AM. Persistent acne in women: Implications for the patient and for therapy. Am J Clin Dermatol. 2006;7:281–90.
3. Orentreich D, Orentreich N. Acne scar revision update. Dermatol Clin. 1987;5:359-68.
4. Jacob CI, Dover JS, Kaminer MS. Acne scarring: A classification system and review of treatment options. J Am Acad Dermatol. 2001;45:109–17.
5. Rivera AE. Acne scarring: A review and current treatment modalities. J Am Acad Dermatol. 2008;59:659-76.
6. 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;121:1421-9.
7. Fabbrocini G, Farella N, Monfrecola A, Proietti I, Innocenzi D. Acne scarring treatment using skin needling. Clin Exp Dermatol. 2009;34:874–9.
8. Liebl H, Kloth LC. Skin cell proliferation stimulated by microneedles. J Am Coll Clin Wound Spec. 2012;4:2–6.
9. Majid I. Microneedling therapy in atrophic facial scars: An objective assessment. J Cutan Aesthet Surg. 2009;2:26-30.
10. Garg S, Baveja S. Combination therapy in the management of atrophic acne scars. J Cutan Aesthet Surg. 2014;7:18-23.

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