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MICRONEEDLING IN FACIAL SCARS: AN EFFECTIVE AND INEXPENSIVE MODALITY

Dermatology

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ABSTRACT

Post acne scars are a result of textural changes in the superficial and deep dermis.Microneedling is a simple and safe technique which works on the principle of controlled skin injury with minimal epidermal damage which stimulating wound healing via production of new collagen and elastin . The present study was undertaken to assess the efficacy of microneedling therapy objectively in facial scars. Thirty patients suffering from localized or generalized atrophic facial scarring of variable etiology were selected and microneedling was performed at 4 weeks interval upto a maximum of 4 sittings. At the end of treatment regimen, the scars were again assessed and patients were followed at 4 weeks interval with final assessment and grading being done at the end of 3 months of follow up, Goodman and Baron grading system was using for objective grading of scars.Out of 28 patients,16 patients (57.14%) achieved excellent response and 9(32%) achieved good response.Microneedling showed effectiveness in acne scars. Better response was seen in rolling and boxcar scars.

KEYWORDS

Acne scars,microneedling,dermaroller

INTRODUCTION

Scar is defined as an area of fibrous tissue that replaces normal skin after an injury. Facial scars can be a very distressing condition and a major cosmetic concern for some people. Although post acne scars comprise majority of facial scars patients presenting to skin OPDs, other causes can be post varicella, post herpetic and post traumatic. Acne usually heal leaving behind pigmentary changes and in some cases with atrophic scarring. If the inflammatory response is severe, it may result in textural changes in the superficial and deep dermis which may result in permanent scars. A simple grading system devised by Goodman and Baron can be used to grade the scars. It's an objective system which grades scars from Grade 1 to 4 as shown in the table 1.[1]

Table 1. Goodman And Baron Grading For Scars

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

Treatment of these type of scars is definitely challenging. Currently, we have a vast range of modalities to offer such as chemical peels, laser resurfacing, punch elevation, subcision, microdermabrasion, dermal grafting, dermal fillers, focal Trichloroacetic acid application etc. Choice of treatment depends upon various factors such as morphology of scars, efficacy, affordability, downtime and interference with daily activities of patient. Lasers like CO2 and Erbium YAG are associated with risks such as long lasting erythema, post inflammatory hypo/hyperpigmentation, dermatitis and herpetic infections etc.[2,3] 100% TCA application can result in itchiness, erythema and scaling etc.[2]

The simplest and safest technique here is microneedling. This minimally invasive procedure, also known as percutaneous collagen induction therapy, is associated with high efficacy and minimal recovery time. It involves a drum shaped device with tiny needles (known as dermaroller) to puncture skin multiple times to produce numerous microchannels. This device which was developed by Fernandes works on the principle of controlled skin injury with minimal epidermal damage.[4,5]It leads to release of various growth factors such as Platelet derived growth factors, Fibroblast growth factors, Transforming growth factor-ß etc. which stimulate wound healing via production of new collagen and elastin.[6,7]This collagen deposition is determined by fibronectin matrix which forms with alignment of fibroblasts.Thus neovascularisation and neocollagenesis leads to reduction of scars as well as skin tightening.It's also being used to enhance the penetration of topical agents and thus finds application in treatment of androgenetic alopecia, melasma and alopecia areata.[8,9]

The present study was undertaken to assess the efficacy of microneedling therapy objectively in facial scars.

MATERIALS AND METHODS

A total of 30 patients were enrolled for the study. Subjects with Grade 2 to Grade 4 atrophic scarring, aged thirteen years or older of either gender and of any racial/ethnic group, in generally good health and willing to comply with the requirements of the protocol were included in the study. Subjects with oral retinoid use within 6 months and topical retinoids within 2 weeks of entry into the study, Laser or superficial chemical peels at the sites to be treated within 3 months of entry into the study, a history of dermabrasion at the sites to be treated, active acne or keloidal tendency, significant medical history or concurrent illness/condition which the investigator felt was not safe for study participation were excluded from the study. Subjects with a history of very frequent herpes simplex infections of the face or with clinical evidence of active herpes simplex infections, history of taking anticoagulant therapy, pregnant or nursing females were also excluded from the study. Informed written consent was taken before the subjects entered into study.The study was approved by institutional ethics committee.

Dermaroller, the standard device consists of 12cm long handle with a cylinder attached at one end. It is embedded with 8 rows and 24 circular arrays of 192 fine needles. Size of needles ranges from 0.5 to 3mm in length bad is chosen based on depth of penetration required. Usually 1.5 to 2mm is considered sufficient for acne scars.

Treatment was carried out by first numbing the area with EMLA. Then rolling the instrument over affected area in four directions- vertical, horizontal, diagonally left and right so that an even pattern of 250-300 skin pricks were produced per cm2.

Patients were photographed and assessed clinically at the time of enrollment to grade the severity of scarring. Relevant investigations were carried out & recorded in prestructured proforma. Microneedling or dermaroller was performed at 4 weeks interval and a maximum of 4 sittings were done. At the end of treatment regimen, the scars were again assessed and patients were followed at 4 weeks interval. The final assessment and grading was done at the end of 3 months of follow up and repeat photographs were taken. The appearance and the grade

of scars was then compared with that in the pre treatment period and any change in grading of scars was noted.

Patients were given topical antibiotic application for two to three days and topical sunscreens for at least a week after each dermaroller treatment.

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

Statistical analysis was done using Fischer Exact test and p value was calculated.

Side effects if any- immediate post procedure or late were also recorded.

RESULTS

All the 30 patients enrolled in the study were suffering from post acne facial scarring.

Majority patients were female (23) while only 7 were male. Age of patients ranged from 18-33 years with mean age of (24 ±3.89) years. The duration of scars ranged from 6 months to 10 years with a mean duration of (3.32 ± 2.65) years. Nineteen out of thirty patients (63.3%) had taken some form of treatment for their acne in the past. Two patients (6.66%) had taken oral isotretinoin treatment for their acne in the past.

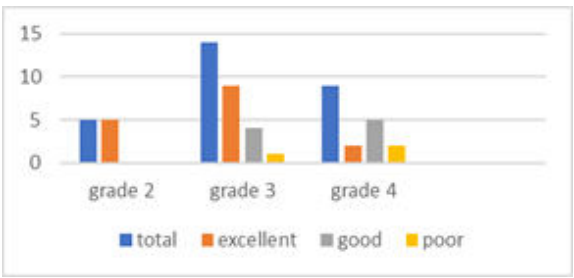
Two patients dropped out of the study without completing their full course of sittings and thus could not be evaluated for final results. Out of 28 patients who completed the study, 9 patients (32%) were with Grade 4 scars, 14 patients (50%) with grade 3 scars while 5 patients (18%) with Grade 2 scars.

In patients with grade 4 scars, 2 achieved excelled response (22.2%), 5 (55.6%) achieved good response while 2 patients (22.2) achieved poor response i.e. there was no change in their grading of scars.

In patients with grade 3 scars, 9 patients i.e. 64.3% achieved excellent response, 4(28.6%) showed good response and only 1 patient (0.7%) showed poor response.In group of patients with grade 2 scars, all patients (100%) showed excellent reponse .Overall, out of 28 patients,16 patients (57.14%) achieved excellent response, 9(32%) achieved good response and only 3 patients (10.7%) did not show any noteworthy improvement. Rolling and boxcar type scars showed better response as compared to icepick scars. Grade 2 and Grade 3 scars showed far better response to microneedling as compared to Grade 4 scars as shown in table 2. Results were analysed drastically and found to be statistically significant (p value 0.04).Figure 1 and 2 show pictures before and after treatment.

Post procedure, there was slight burning and erythema which disappeared 2-3 days later according to the patients. There was no interference with the daily activities. Two patients presented with post inflammatory hyperpigmentation which decreased after application of depigmenting creams and strict photoprotection within a short time. No other significant side effects were noted.

Table 2: Graph comparing results in each grade of scars in our study



DISCUSSION

Microneedling is a process which involves puncturing of skin with hundreds of fine needles to cause controlled damage to the dermis which causes breakage of damaged collagen strands tethering the scars and also stimulate synthesis of new collagen. In the process, there is minimal or no damage to epidermis which is an advantage over other techniques of scar removal.

Dermaroller, the standard device that is used in microneedling consists of 12 cm long handle with a cylinder attached at one end with 192 needles in 8 rows and 24 circular arrays. Size of needles range from 0.5 to 3mm in length and is chosen based on depth of penetration required. Usually 1.5 to 2mm is sufficient for acne scars.Treatment is carried out by rolling the instrument over affected area. Multiple sittings at an interval of 3-8 weeks are needed. Improvement in the scars continues upto 3-6 months after the last sitting.

In the past, there have been various studies conducted for evaluating the efficacy of skin needling alone as the treatment for facial scars.[7,10,11] The median number of sittings in these studies were three.[12]In Indian population, one such study was conducted which included 37 patients of facial scarring and good to excellent response was achieved in 88.7% of patients. [11] Another such study was done by Dogra et al., In which, over 36 patients which showed 50-75 % improvement in majority of patients. [10]. In our study, Grade 2 scars showed excellent results in 100% of cases while Grade 3 in 64.3 %. Overall the results in our study were found to be statistically significant as they were in previous studies.[7,13] Similar to these studies, our study also showed maximum effectiveness of this technique in rolling and boxcar scars. Pitted scars on the other hand showed less response and need other techniques like laser resurfacing etc.

CONCLUSIONS

Microneedling is a safe and minimally invasive procedure for acne scars with good efficacy and minimal side effects, but more studies are still needed to be conducted wherein microneedling is used in conjunction with other modalities of treatment such as topical vitamin c, hyaluronic acid and TCA CROSS

Figure 1:

Figure:2

Conflict of interest: none

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Ethical approval: Approved by institutional ethics committee

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