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Efficacy of microneedling radiofrequency for acne scars

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Abstract

Acne scarring is the most frequent complication of acne that significantly affects the quality of life in adolescent age group. The impact on physical and psychosocial well-being of the sufferers is also affected. Nearly 80% of acne scars are seen in 11-30 years of age. Delayed in initiation of treatment of acne scars or inappropriate treatment further complicates the scenario. Treatment modality can also be categorized as energy and non-energy based. Fractional microneedling radiofrequency (MNRF) is a promising ablative approach. It utilizes radio frequency energy to penetrate deep in the dermis without causing significant injury to epidermis. The small wounds close immediately but the mechanical injury initiates wound healing process and collagen remodelling. Hence we conducted this study to analyse the efficacy of Microneedling radiofrequency for the treatment of acne scars.

Aim and Objectives: To study the outcome of Fractional microneedling radiofrequency in acne scars.

Material and Methods: 15 patients with acne scars were included for the study and microneedling radiofrequency was done using ENSEMBLE MNRF machine- manufactured by Bison, Korea- FDA approved – BS-IS-25.

Results: 73.4% patients showed good improvement in the reduction of acne scars with very less downtime.

Conclusion: Fractional Microneedling Radiofrequency is more effective in treating acne scars with decreased downtime. The response may vary with machines. Further continuation of treatment might help to achieve a better outcome as scars only modify but never disappear completely.

Keywords: Acne scars, collagen remodelling, microneedling radiofrequency

Introduction

Acne scarring is the most frequent complication of acne that significantly affects the quality of life in adolescent age group. The impact on physical and psychosocial well-being of the sufferers is also affected. Nearly 80% of acne scars are seen in 11-30 years of age. Genetic susceptibility, familial tendency, severe forms of acne, occlusion, irritation, stress and frequent manipulation are common factors associated with acne scars.

Acne scar can be classified into atrophic and hypertrophic scars. The atrophic scars (80-90%) can be manifested as ice pick, rolling and boxcar. Based on Goodman and Barron's qualitative acne scar grading system, the acne scar is graded ranging from grade 1 to grade 4. It can also be classified as macular, mild, moderate and severe forms.

The post acne scarring is proportionate to early onset and severity of acne. Delayed in initiation of treatment of acne scar or inappropriate treatment further complicates the scenario. A change in skin texture, skin colour and pore size is observed. Patients often complain of anxiety, depression and low self-esteem. Early and appropriate intervention of acne is the best means to minimize and prevent acne scarring.

Conservative management and anti-acne measures using topical antibiotics, retinoids, chemical peels are not very effective in treating acne scars. Various surgical techniques like microneedling, subcision, microderm abrasion, TCA cross and ablative lasers are not much suitable for darker Indian skin as it causes post inflammatory hyperpigmentation.

Various studies have shown that radiofrequency microneedling as a promising ablative approach. Fractional microneedling radiofrequency is an ablative technique. It utilizes radio frequency energy to penetrate deep in the dermis without causing injury to epidermis. In bipolar RF the energy flows between 2 adjacent electrodes which are present within the operator's handpiece. The depth of penetration is directly proportionate to approximate half the distance between the electrodes^[1].

Radiofrequency creates oscillating electrical current causing vibration and collisions between charged molecules causing heat production which was described by Belenky and colleagues [2]. Electrical energy is converted to thermal energy where tissue resistance is met [3]. Higher energies can be delivered with bipolar and monopolar, but the depths are different.

Energy transfer is dictated by Ohm's Law: energy (J) $5 I^2 R T$ (where I is the current, R is the tissue impedance, and T is the time of application). RF energy is not affected by pigmentation of skin and type of the skin Impedence is affected by the skin hydration, composition of the electrolyte, amount of collagen and various other factors [4]. It is purely an electrothermal effect. The RF devices used in aesthetic procedures range from 0.3 to 10 MHz. Depth of penetration is inversely proportional to frequency used [5]. It uses 0.5 to 4.0 mm needles pressing into the skin. The small wounds close immediately but the mechanical injury initiates wound healing process and collagen remodelling.

Aim and Objectives

To study the outcome of Fractional Microneedling Radiofrequency (MNRF) in acne scars.

Material and Methods

Study design: A comparative interventional study.

Sample size: 15 patients with facial acne scars.

Inclusion Criteria

1. All the patients with acne scars who have attended to the Dermatology Venerology Leprosy Department of Rajah Muthiah Medical College and Hospital.
2. Patients who have given consent and are willing for follow up.

Exclusion Criteria

1. Family/ Personal history of keloid.
2. Active inflammation/infection involving the face.
3. Oral isotretinoin use within 4 weeks for treatment of acne scars.
4. Pregnancy and lactation.

Methodology

Fifty patients with acne scars were screened at the Dermatology OPD and those who met the criteria and was willing to undergo the study were enrolled. Demographic profile of the patients was assessed. All the history pertaining to acne, acne scarring, treatment taken so far and the outcome was analyzed. Fifteen patients who fulfilled the inclusion, exclusion criteria and willing to undergo the study were included for evaluation. The objective and methodology of the study was explained to the participants in their own language and informed written consent was obtained. History and clinical findings were recorded. Clinical lesions were photographed. For all the patients, the face was cleansed with an antiseptic. Topical anaesthetic cream containing prilocaine 2.5% and lidocaine 2.5% was applied over the face and occluded. After 45 minutes the cream was wiped off. Fractional microneedle

radiofrequency was performed using a microneedling radiofrequency machine [Ensemble MNRF machine-manufactured by Bison, Korea- FDA approved – Model BS-IS-25]. Power level, exposure time, depth of the needle insertion was manually set on the machine depending on the area to be treated. Power used was 20 watts, out time 50 ms and repeat interval was 0.5 seconds. The hand piece was brought in contact to the skin. The machine was operated through the switch in the handpiece resulting in penetration of microneedles through hand piece into the skin and thus creating microfractional holes in the epidermis and dermis. Each area was treated with two passes. After the procedure, microneedles were withdrawn automatically. End point of the treatment was pinpoint bleeding. The skin was cleaned after the treatment. Oozing was controlled with minor pressure. Cooling gel pack was applied to minimize bleeding and pain. Topical antibiotic cream and sunscreen with SPF 30 was applied. Treatment was scheduled once in 3 weeks for a total of six sessions.

Evaluation

Clinical assessment of improvement of scars was evaluated by

1. All patients were asked to perform a subjective evaluation of the treatment.
2. Using digital camera, facial photography was taken before and after the treatment, ensuring identical camera setting, lighting and patient positioning.
3. Criteria for evaluation for acne scars at the initiation and after six sessions was Goodman and Baron's quantitative and qualitative scale assessment.

Results

In our study, 7 patients (46.7%) were males and 8 patients (53.3%) were females with almost equal gender ratio. The mean age in our study was 21.20 years. More number of patients were in the age group of 21-30 years of age followed by 18-20 years.

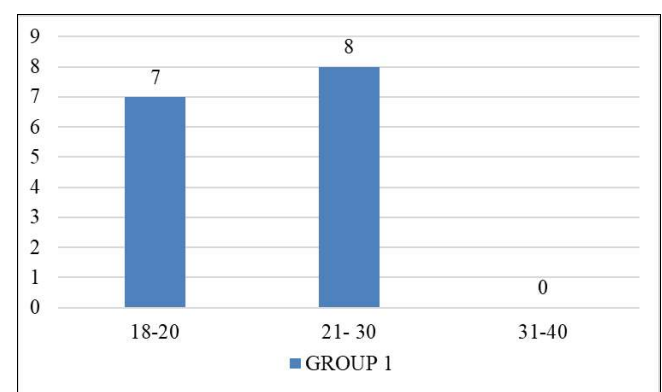


Chart 1: Age distribution of acne scar patients

In the present study groups, out of 15 patients, 53.5% (8 patients) were in the age group 21-30 years, followed by 46.7% (7 patients) in the age group 18-20 years.

Table 1: Goodman and baron’s qualitative assessment of reduction of acne scar

Pre-treatment grade of acne scars	Reduction of acne scar (n=15)				Total
	Reduction by 3 grades (very good) N (%)	Reduction by 2 grades (moderate) N (%)	Reduction by 1 grade (mild) N (%)	No reduction N (%)	
Grade 2	0 0%	0 0%	1 100.0%	0 100%	1 100.0%
Grade 3	0 0%	8 88.9%	1 11.1%	0 100%	9 100.0%
Grade 4	2 40.0%	3 60.0%	0 0%	0 100%	5 100.0%
Total	2 13.3%	11 73.4%	2 13.3%	0 100%	15 100.0%

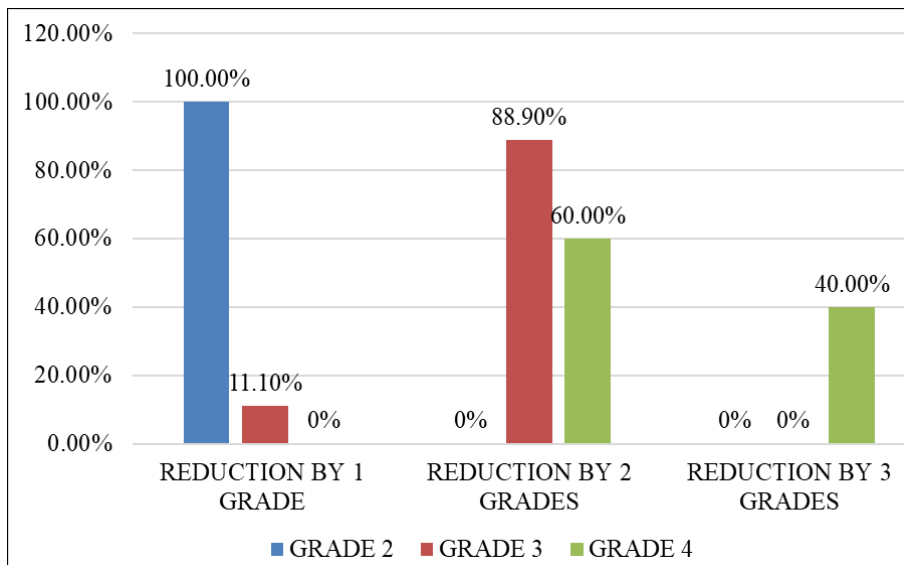


Chart 2: Goodman and baron’s qualitative assessment of post treatment reduction of scars

Out of 15 patients, very good improvement (i.e. grade three reduction) was seen in 2 cases (13.3%), mild improvement (one grade reduction) was seen in 2 cases (13.3%) but %).

majority of acne scars improved by two grades in 11 cases (73.4

Table 2: Goodman and baron’s quantitative assessment of reduction of scars in group 3 (MNRF)

Minimal reduction N (%) (0-5)	Moderate reduction N (%) (5-10)	Good reduction N (%) (10-15)	Very good reduction N (%) >15	Total N (%)
1 (6.7%)	2 (13.3%)	5 (33.3%)	7 (46.7%)	15 (100.0%)

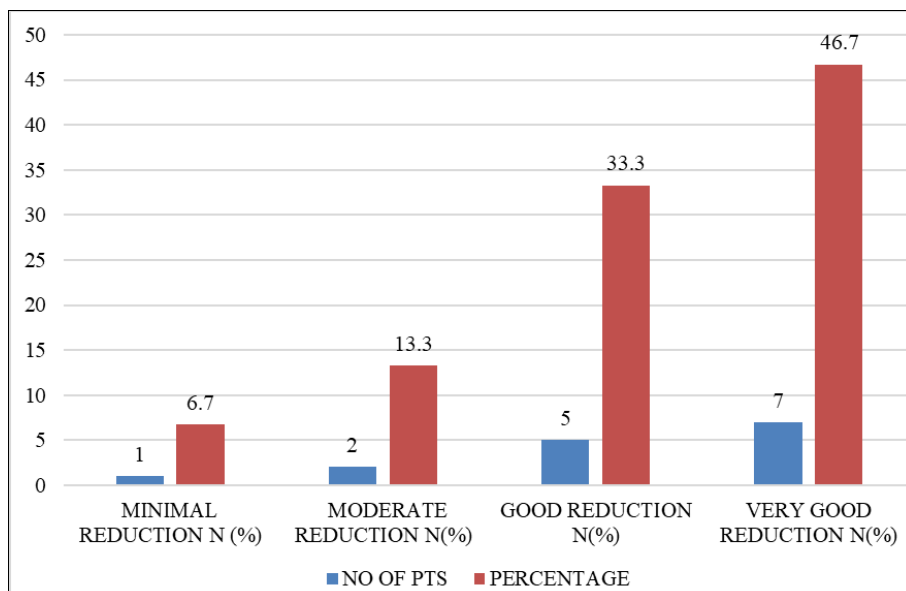


Chart 3: Goodman and baron’s quantitative assessment of post treatment reduction of scars in group 3

Quantitative assessment revealed that, 7 patient (46.7%) showed very good reduction, 5 patients (33.3%) showed good reduction, 2 patients (13.3%) showed moderate and 1 patient (6.7%) showed minimal reduction.



Fig 1: Microneedle radiofrequency



Fig 2: Microneedling radiofrequency done on a patient



Fig 4: Right side of the face



Fig 5: Left side of the face

Discussion

Acne is a chronic dermatological inflammatory disease which involves the hair follicles and sebaceous glands [6]. Acne scars are the most common complication of acne. It commonly affects teenagers and young adults aged 11 – 30 years. The severity of the acne scars depends on the severity and type of active acne in the individual patient and personal healing ability. Scars are formed at the site of tissue injury causing decrease or increase in collagen retraction of skin resulting in atrophic or hypertrophic scarring [7]. This impacts on physical and psychosocial well-being of the sufferers of acne scars. There are various topical and systemic therapies which does not effectively treat acne scarring. For effective treatment, classification of acne scars is carried out and approaches are chosen accordingly [8].

The present study showed majority of the patients were in the age group of 21 to 30 and the mean age of the patients were 21 years. All patients (100%) had boxcar scars and ice pick scars and rolling scars. At the end of 6 sessions, the qualitative assessment out of 15 patients, very good improvement (i.e. grade three reduction) was seen in 2 cases (13.3%), mild improvement (one grade reduction) was seen in 2 cases (13.3%) but majority of acne scars improved by two grades in 11 cases (73.4%). Quantitative assessment revealed that, 7 patient (46.7%) showed very good reduction, 5 patients (33.3%) showed good reduction, 2

patients (13.3%) showed moderate and 1 patient (6.7%) showed minimal reduction.

The most common side effects observed in our study group were erythema and edema, which resolved subsequently and was not significant.

In our study, the mean age of patients with acne scars were 21.0 ± 3.742 which was similar to age distribution 25.6 ± 5.2 , seen in study done by Yaseen U *et al.* [9] Layton *et al* reported that facial scarring affects both sexes. Both sexes were equally affected in our study with a slight female preponderance. Studies reported by Pudukadan *et al* showed treatment with MNRF had improvement of at least 1 acne scar grade in 11 of 19 patients (57.9%) after 1 month and in 9 of 9 patients (100%) after 3 months similar to our study with increased response to acne scars with lesser downtime of one month [10].

Conclusion

Acne vulgaris is a common dermatological condition. The results of this study shows MNRF is more effective in improving the quality of facial acne scars. It is more effective in treating acne scars with decreased downtime. We used BISON MNRF machine (manufactured by Ensemble, Korea, FDA approved). The response may vary with machines. There were no significant side effects observed in this study except minimal post inflammatory hyperpigmentation which resolved in few weeks. Further continuation of treatment might help to achieve a better outcome as scars only modify but never disappear completely.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Sadick NS, Makino Y. Selective electro-thermolysis in aesthetic medicine: A review. *Lasers Surg Med.* 2004;34(2):91-97. Doi: 10.1002/lsm.20013. PMID: 15004818.
2. Belenky I, Margulis A, Elman M, *et al.* Exploring Channeling Optimized Radiofrequency Energy: A Review of Radiofrequency History and Applications in Esthetic Fields. *Adv Therapy.* 2012;29:249-266.
3. Michael H Gold. The increasing use of nonablative radiofrequency in the rejuvenation of the skin, *Expert Review of Dermatology.* 2011;6(2):139-143.
4. Schepps JL, Foster KR. *Phys. Med. Biol.* 1980;25:1149.
5. Karen L. Beasley, Robert A. Weiss, Radio-frequency in Cosmetic Dermatology, *Dermatologic Clinics.* 2014;32(1):79-90.
6. Soltani-Arabshahi R, Wong JW, Duffy KL, Powell DL. Facial Allergic Granulomatous Reaction and Systemic Hypersensitivity Associated with Microneedle Therapy for Skin Rejuvenation. *JAMA Dermatol.* 2014;150(1):68-72. Doi: 10.1001/jamadermatol.2013.6955.
7. Colak O, *et al.* Patient perception, satisfaction and cosmetic results of platelet-rich plasma in the treatment of acne scars: a patient-reported outcome of a non-surgical management. *Int J Res Dermatol.*

2019;5(2):361-369.

8. Kubba R, Bajaj AK, Thappa DM, Sharma R, Vedamurthy M, Dhar S, *et al.* Indian Acne Alliance (IAA). Acne in India: Guidelines for management – IAA consensus document. *Indian J Dermatol Venereol Leprol.* 2009;75:52-53.
9. Yaseen U, *et al.* Combination of platelet rich plasma and microneedling in the management of atrophic acne scars. *Int J Res Dermatol.* 2017 Sep;3(3):346-350.
10. Pudukadan D. Treatment of Acne Scars on Darker Skin Types Using a Noninsulated Smooth Motion, Electronically Controlled Radiofrequency Microneedles Treatment System. *Dermatol Surg.* 2017 Jan;43(Suppl 1):S64-S69.

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