Saudi Journal of Medicine (SJM)
Scholars Middle East Publishers
Dubai, United Arab Emirates
Website: www.saudijournals.com

ISSN 2518-3389 (Print)
ISSN 2518-3397 (Online)

Role of Autologous Platelet Rich Plasma Therapy with Dermaroller in Post Acne Atrophic Scars

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Article History
Received: 16.07.2018
Accepted: 27.07.2018
Published: 30.07.2018

DOI:
10.36348/sjm.2018.v03i07.013

Abstract: Acne is a common problem that can also leave behind permanent scarring leading to low self-esteem. Various treatment modalities can help dealing with these acne scars. The aim of this study is to compare efficacy of PRP with dermaroller against with PPP with dermaroller. A prospective study of 31 patients was done. After microneedling, PRP and PPP was applied on each side of face. The procedure was repeated every four weeks and scars were evaluated by Goodman and Barron grading system. Significant improvements were found on both sides of face and no substantial difference was observed on either of the treated sides. Also dermaroller therapy showed improvement in *rolling type and boxcar* types of acne scars only. Dermaroller is a safe and affordable device used with or without PRP and PPP for treatment of post acne scars
Keywords: Post acne scars, Microneedloing, PRP, PPP, Goodman and Barron grading.

INTRODUCTION

Acne affects over 90% teenage group [1-3]. It can results in various types of acne scars.1%-11% in acne patients develop scarring [4, 5] leading to lowered self-esteem [6].

Many treatment modalities have been introduced for acne scars but none of them is very effective, giving results between 50-70 % in improvement of scars.

This study is to assess efficacy of PRP with dermaroller in post acne scars as this conventional modality is cheaper and safe, hence within the reach of vast Indian middle class population.

MATERIALS AND METHODS

A prospective study, including 31 patients, fulfilling the inclusion criteria

Present study was conducted in dept. of Dermatology (Skin and VD) of SAMC and PGI from January 2014 to June 2015.

Informed consent was taken

After careful history and examination, the acne scars were evaluated for number, types and their extent.

The grading and scoring of the scars was done as per Goodman-Baron qualitative scoring (GBQS) system [7] and Echelled' Evaluation Clinique des Cicatrices d'Acn´e scale [8] (ECCA).

Inclusion criteria

- Patients with Grade 2 to Grade 4 acne scars.
- Patients above 18 years of age.

Exclusion criteria

- Active acne.
- Keloidal tendency/keloidal scarring.
- Active skin infection.
- Pregnant/ lactating mothers.
- Patients who has taken oral isotretinoin within last 3 months.
- Unrealistic expectations.
- Patients with platelet dysfunction.
- HIV or HBV infection.
- Patients on anti-coagulation therapy.

After 'Microneedling', on both sides of the face(as per standard protocol),over left side, freshly prepared PRP (prepared as per the 'Double spin technique' [9] was applied and onthe right side, PPP was applied.

Same procedure was repeated at all visits at an interval of four weeks each,clinical photographs were taken and grading of the scarswas assessed.

The patient was asked to grade the severity of his/her acne scars, out of a total of 10 points. This score was taken before the 1st sitting of dermaroller therapy and after the completion of 4th sitting.

Follow up

The final follow up was done after 2 months of the 4th sitting, and patients were assessed for the improvement in the ECCA and GBQS scores.

STATISTICAL ANALYSIS

The mean comparison between the sides was done using unpaired‘t’ test, while mean comparison between the two time intervals for the same group was done using paired ‘t’ test. A p value of < 0.05 was considered as statistically significant.

The statistical Package MiniTab Version 17.0 was used for analysis.

PHOTOGRAPHIC ASSESSMENT

RESULTS AND OBSERVATION

Age Group	Number	Percentage
<= 20 years	3	9.68
21-25 years	17	54.84
26-30 years	9	29.03
31-35 years	2	6.45
Total	31	100.00

Gender	Number	Percentage
Female	13	41.94
Male	18	58.06
Total	31	100.00

Age Group	Female		Male	
	No.	%	No.	%
<= 20 years	1	7.69	2	11.11
21-25 years	6	46.15	11	61.11
26-30 years	4	30.77	5	27.78
31-35 years	2	15.38	0	0.00
Total	13	100.00	18	100.00

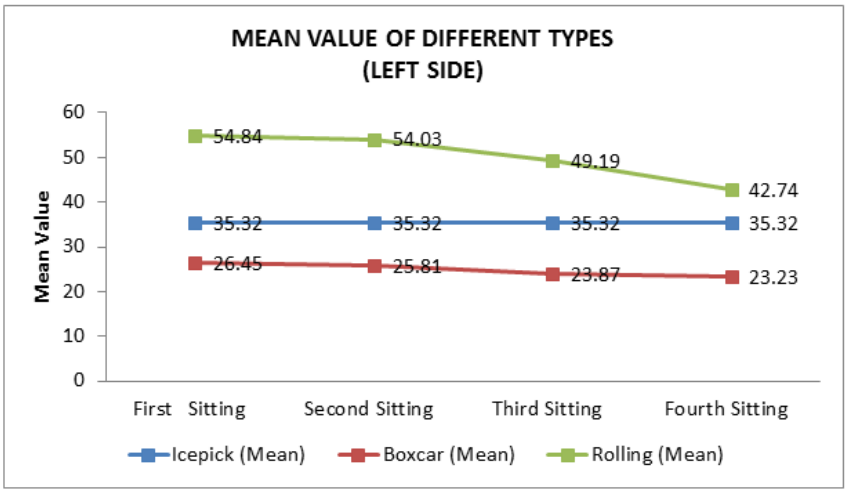
Duration of acne scars	Number	Percentage
1-2 years	8	25.81
2-3 years	13	41.93
3-4 years	5	16.13
More than 4 years	5	16.13
Total	31	100.00

Previous medical treatment	Number	Percentage
None	10	32.26
Oral and topical	8	25.81
Oral and topical with chemical peeling	4	12.90
Oral and topical with MDA + chemical peeling	1	3.23
Oral and topical with microdermabrasion	2	6.45
Topical	6	19.35
Total	31	100.00

ASSESSMENT AS PER ECCA GRADING

RIGHT SIDE

Scar type	First Sitting	Second Sitting	Third Sitting	Fourth Sitting	Follow up
Ice-pick	37.26±11.54	37.26±11.54	37.26±11.54	37.26±11.54	37.26±11.54
Boxcar	29.68±16.22	29.68±16.22	27.10±16.77	26.45±16.64	26.45±16.64
Rolling	58.87±21.94	58.06±22.72	54.84±21.81	48.39±23.22	48.39±23.22
Total	125.81±30.93	125.00±31.54	119.19±28.35	112.10±27.23	112.10±27.23



COMPARISON BETWEEN FIRST AND FOLLOW-UP VISIT

RIGHT SIDE

Comparison of ECCA scores from baseline - Right side

Type	First Sitting	Follow-up	't' Value	P value
	Mean±SD	Mean±SD		
Icepick	37.26±11.54	37.26±11.54	-	-
Boxcar	29.68±16.22	26.45±16.64	2.40	0.023*
Rolling	58.87±21.94	48.39±23.22	4.65	0.000*
Total	125.81±30.93	112.10±27.23	4.89	0.000*

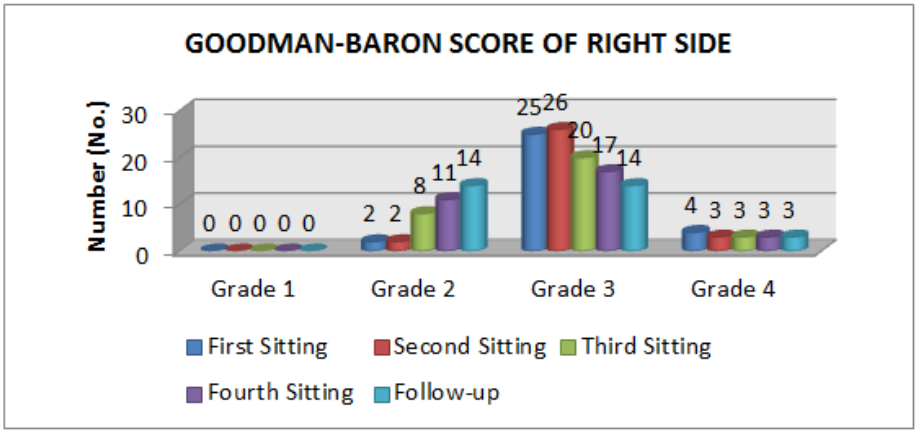
LEFT SIDE

Comparison of ECCA scores from baseline - Left side

Type	First Sitting	Follow-up	't' Value	P value
	Mean±SD	Mean±SD		
Icepick	35.32±11.32	35.32±11.32	-	-
Boxcar	26.45±13.05	23.23±13.76	2.40	0.023*
Rolling	54.84±22.75	42.74±19.57	5.30	0.000*
Total	116.61±29.19	101.29±24.43	5.98	0.000*

No. of patients with various grades (Goodman-Baron) of acne scars
Right side

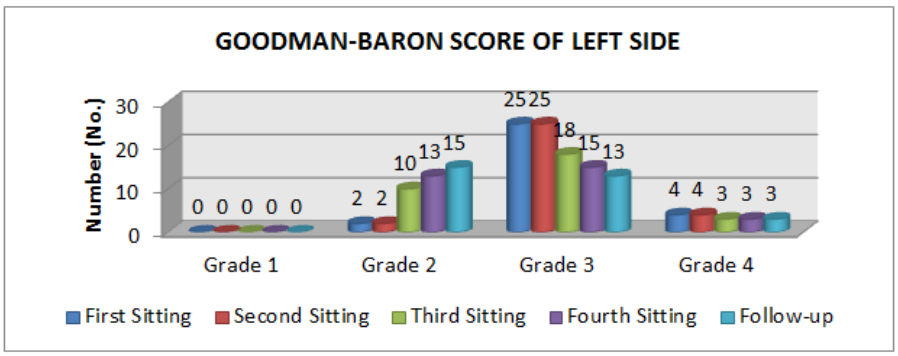
Grades of scars	First Sitting	Second Sitting	Third Sitting	Fourth Sitting	Follow-up
Grade 1	Nil	Nil	Nil	Nil	Nil
Grade 2	2	2	8	11	14
Grade 3	25	26	20	17	14
Grade 4	4	3	3	3	3



Graph-11: Goodman & baron score of acne scars at each sitting- Right side

No. of patients with various grades (Goodman-Baron) of acne scars
Left side

Grades of scars	First Sitting	Second Sitting	Third Sitting	Fourth Sitting	Follow-up
Grade 1	Nil	Nil	Nil	Nil	Nil
Grade 2	2	2	10	13	15
Grade 3	25	25	18	15	13
Grade 4	4	4	3	3	3



Goodman & baron score of acne scars at each sitting- Left side

COMPARISON BETWEEN FIRST SITTING AND FOLLOW-UP IN GOODMAN-BARON SCORES

Comparison of Goodman-Baron scores from baseline

Side	First Time point	Follow-up	't' Value	P value
	Mean±SD	Mean±SD		
Right side	3.06±0.44	2.65±0.66	4.65	0.000*
Left side	3.06±0.44	2.61±0.67	4.97	0.000*

COMPARISON IN GOODMAN-BARON SCORES BETWEEN THE TWO SIDES OF FACE

Comparison of Goodman-Baron scores between two sides

Time Point	Right Side	Left Side	't' Value	P value
	Mean±SD	Mean±SD		
First Sitting	3.06±0.44	3.06±0.44	0.000	1.000
Second Sitting	3.03±0.41	3.06±0.44	0.30	0.766
Third Sitting	2.84±0.58	2.77±0.62	0.42	0.674
Fourth Sitting	2.74±0.63	2.68±0.65	0.40	0.694
Follow-up	2.65±0.66	2.61±0.67	0.19	0.849

Unpaired't' test.

Distribution according to side effects

Side Effects	Number	Percentage
None	18	58.06
Erythema	8	25.81
Pigmentation	4	12.90
Herpes Simplex infection	1	3.22
Total	31	100.00

(N=31)

Improvement in acne scars by patient self-assessment

	Mean	Std. deviation	Mean percentage improvement	P value
Patient scar self-assessment Pre	6.77	1.28	30.42%	<0.0001 Differences is statistically Significant

DISCUSSION

Age distribution - Seventeen out of 31(54.84%) patients were from 21-25 years age group and 9 (29.03%) from 26-30 years age group. The mean age was 24.77±3.69 years. Out of the 26 patients in 20-30 years age group, 51.61% were males and 32.25% were females.

In another Indian study by Garg and Baveja, 49 patients were treated (30 females and 19 males) amid 18-39 years of age with mean age of 25.6±5.2 years [10].

In a study by Imran Majid, the patients varied from 13 to 34 years in age, with the mean age of 22.4 years[11].

GENDER DISTRIBUTION

In our study, out of the total 31 patients 58.06% (18 patients) were males and 41.94% (13 patients) were females. The male to female ratio of patients in our study was 1.38:1.

Goodman accounted 11% frequency of acne scars in men and 14% in women [12]. Goulden reported scarring in 77.2% men and 58.5% women. Icepickscars were the most frequent type [13].

Our study shows a male preponderance which may be due increased awareness regarding treatment for acne scars.

PREVIOUS TREATMENT

Majority of the patients had not undergone any previous treatment for acne scars i.e. 32.26% (10) of the total study group. The most common previously received treatment was oral and topical medication (8 patients, 25.81%).

Another study illustrated that about 16% of patients with acne seek proper treatment, and among those patients seeking such help, 74% wait for greater than 12 months, 12% wait for 6 to 12 months, 6% wait for 6 months and only 7% wait for less than 3 months for professional therapy[14].

In our study, there was improvement of acne scars on both sides as per the ECCA scoring. The improvement was noted in boxcar and rolling scars and hence in the overall score of the face. There was no statistically significant difference seen in improvement of left side of face where microneedling along with platelet rich plasma (PRP) was done as compared to the right side of the face where microneedling was done along with platelet poor plasma (PPP), suggesting that there is significant effect of dermaroller only and not PRP.

In a study by Imran Majidwithmicroneedling therapy, out of 36 patients, 34 realized a slump in the severity of their scarring by one or two grades. More than 80% of patients assessed their treatment as 'excellent' on a 10-point scale[15].

In the study done by G.Fabbrocini *et al*. scar severity grade in all patients was greatly reduced on the face, but the upgrading was more on the side treated with both skin needling and PRP[16].

Evaluation by Goodman & Baron Qualitative Grading

In our study, as per the Goodman-Baron qualitative grading of atrophic acne scars, there was significant improvement on both sides of the face, while no substantial difference was observed on either of the treated sides.

Chandrashekar *et al*. made use ofmicroneedling fractional radiofrequency,to treat moderate to severe acne scars, assessed the improvement with GBQS showed that out of 31 patients with grade 3 and grade 4 acne scars, 80.64% showed upgrading by 2, and 19.35% showed upgrading ofby 1 point[17].

In a study by Garg and Baveja, out of 16 patients with Grade 4 scars, 10 (62.5%) patients enhanced to Grade 2 and 6 (37.5%) patients enhanced to Grade 3 scars. Out of 22 patients with Grade 3 scars, in 5 (22.7%) scars were gone, 2 (9.1%) enhanced to Grade 1 and 15 (68.2%) enhanced to Grade 2. All 11 (100%) patients with Grade 2 scars were left with no scars[18].

SIDE EFFECTS

Tolerable pain was the most common side effect in all patients. Nearly 19 patients (61.29%) in our study didn't have any post procedure side effects. Out of the rest 12 patients (38.71%), most common side effect was erythema, seen in 8 patients (25.81%), which was immediate and used to persist till 4-7 days.

In the study by Garg and Baveja, after micro needling, fleeting erythema and oedema lasted for 1-4 days with a mean of 2.4±0.7 days. Post procedure peeling of skin was present from 2 to 7 days with a mean of 4.4±1 day. Just three patients (6%) developed hyper-pigmentation [19].

It is noteworthy that no scarring occurred in our study, similar to previous micro needling studies [20-23]. This could be explained by the fact that needling up regulate the expression of TGF-β3,which helps in prevention of scarring[24,25].

However, post-treatment scarring (tram track scarring) was only reported in 1 patient by Pahwa *et al.* who supposed that this scarring may be due to the use of a bulky needling device or sturdy pressure by the apparatus [26].

SUMMARY & CONCLUSION

The following conclusions can be drawn from our study-

- Microneedling using dermaroller along with platelet rich plasma does not have any added advantage over microneedling alone in the treatment of post acne atrophic scars.
- Dermaroller treatment intrinsically gives significant improvement in post acne atrophic scars.
- Dermaroller therapy shows improvement in the rolling type and boxcar type of post acne atrophic scars where as it has no improvement on ice pick type of atrophic scars.
- Dermaroller is a safe and affordable device and microneedling therapy with or without PRP is a cheaper option of treatment for post acne atrophic scars.

LIMITATIONS OF THE STUDY

- A significant drawback of this study was its uncontrolled and unblended nature.
- Longer study duration is probably required to best assess the improvement in scars as collagen remodeling continues up to 6 – 9 months after the last treatment.
- A larger sample size and a longer follow-up would have allowed us to gather more data pertaining to this therapy and hence improving the results. Objective assessment of scars should not be done using digital photographs as use of flash tends to underestimate scar depth and use without flash tends to overestimate scar depth due to shadow effect.
- Studies are necessary to ascertain if activation of PRP makes any difference in the treatment outcome of acne scars as compared to the non-activated PRP.
- This procedure was mostly side effect free. Mild erythema was the only side effect which was noted in few of the patients which used to subside in a matter of 4-7 days.
- Even though the ECCA & Goodman Baron scoring systems are useful for evaluation of post treatment improvement of acne scars, there is a need for a better scoring method that highlights the improvement in a better way.
- There is a need for a universal, reproducible, standard scoring system for the assessment of improvement in acne scars which can be coherent with the visible results.
- Young adult males in the age group of 20-30 years of age are the most common group of population who seek treatment for acne scars.
- There was an overall improvement noted in the patients' facial appearance as documented by photographic assessment and patient's self-assessment scores.
- It is evident that some modalities are more effective in certain types of acne scars, and because almost

all types of scars are present in almost every patient, combination therapy seems to be the best practical approach for the treatment of post acne atrophic scars.

To sum up, our study proved the lack of utility of PRP in treatment of post acne atrophic scars whereas it reaffirmed the position of derma roller as one of the first line of treatment. Hence, dermaroller can be used safely and efficaciously for treatment of the scars and reduce the patient's psychological stress due to acne induced scarring.

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