

# Split Face Comparative Study of Microneedling with PRP Versus Microneedling with Vitamin C in Treating Atrophic Post Acne Scars

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## ABSTRACT

**Introduction:** Acne scars are largely preventable complications of acne. 95% of the scars occur over the face thus impacting the quality of life. Correction of scars is the priority for acne patients. **Materials and Methods:** Thirty patients with post acne atrophic facial scars attending the OPD during the period from April to October 2013 were offered four sittings of microneedling with PRP on one side and microneedling with vitamin C on other side of the face at an interval of 1 month. **Results:** Twenty-seven out of the total 30 patients completed the treatment schedule. Two patients were lost to follow up and one dropped out of the study due to severe PIH. Mean age of the patients was 27.5 years. Out of 30 patients, 23 achieved reduction in scarring by one or two grades. Excellent response was seen in five (18.5%) patients with platelet-rich plasma (PRP) as compared to two (7%) patients who received treatment with vitamin C according to physician's assessment. As far as up gradation by 1 score is considered, i.e., good response, it was similar in both cases. Vitamin C did not prove to be as efficacious as PRP since 10 (37%) patients had poor response in vitamin C-treated area compared to only 6 (22.2%) patients who underwent PRP therapy, but vitamin C proved to be efficacious in dealing with post inflammatory hyper-pigmentation secondary to acne. Patients were more satisfied with PRP as compared to vitamin C. The results were evaluated and statistical analysis was done using SPSS 16.0.2. **Conclusions:** Overall results were better with microneedling and PRP. Vitamin C combined with microneedling also showed improvement with respect to firmness and smoothness of skin; as well as post inflammatory hyper-pigmentation. Microneedling combined with PRP proved to be good in treating boxcar and rolling scars but had limited efficacy in dealing with ice pick scars.

**KEYWORDS:** Post acne scars, atrophic scarring, dermaroller, microneedling, platelet rich plasma, vitamin C

### REC Review:

Risk	: 3.0	0 = maximum risk,	5 = least risk
Efficacy	: 3.0	0 = minimum efficacy,	5 = maximum efficacy
Cost	: 3.0	0 = very expensive,	5 = least expensive

## INTRODUCTION

Improvement of scars is a common request from acne patients. Majority of the acne scars occur on the face, thus impacting the quality of life. Facial scarring has always

been a challenge to treat and there are different treatment options, like dermabrasion, microdermabrasion, chemical peeling, and laser resurfacing.

However, a majority of these treatment options have the limitation of either being marginally effective or else having considerable morbidity. New treatments and techniques are being added over the last few years to overcome these limitations. One novel modality of treatment is microneedling therapy also known or collagen induction therapy. Microneedling when combined with platelet-rich plasma (PRP) or vitamin C seems to be a promising treatment of atrophic acne scars.

In this study, we compared the efficacy of microneedling with PRP against microneedling with topical vitamin C in treating atrophic post acne scars in a split face design.

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## MATERIALS AND METHODS

Thirty patients of atrophic post acne facial scars, who attended the cosmetology OPD in Victoria Hospital and Bowring and Lady Curzon Hospital attached to BMC and RI during the period from April to October 2013, were offered four sittings of treatment at an interval of 4 weeks between sessions.

### Inclusion criteria

All patients presenting with Goodman and Baron Grade II, III, IV acne scars.

### Exclusion criteria

1. Presence of active acne lesions.
2. Patients having keloid scarring or keloidal tendency.
3. History of bleeding disorder and anticoagulant therapy.
4. Oral steroid therapy.
5. Active skin infection like warts, herpes and bacterial infection.
6. Pregnancy and lactation.

The patients were thoroughly evaluated and grading of the acne scars was done using Goodman and Baron Scale. They were explained about the microneedling, PRP therapy and vitamin C application. Patients were also explained about the cost factor involved, benefits, duration, possible side effects and prognosis of the treatment. An informed consent was obtained. Complete blood count including platelet count was done. Digital photographs of both sides of face were taken. The area of interest was anaesthetised using a thick application of topical anaesthetic cream (EMLA) for about 30-45 minutes before the procedure.

For PRP, 10 ml of autologous whole blood was collected into tubes containing acid citrate dextrose (ACD) and centrifuged at 1500 rpm for 10 minutes in order to get PRP at the top of the test tube. Then, the PRP was further centrifuged at 3700 rpm for 10 minutes at room temperature of 22°C in order to obtain a platelet count 4.5 times higher than the base line (i.e., 8-9 lakhs/ $\mu$ l). Platelet-poor plasma (PPP) was partly removed and partly used to resuspend the platelets. Calcium gluconate was added as an activator (1:9), i.e., 1 ml of calcium gluconate in 9 ml of PRP.

Microneedles with 1.5 mm length and 192 needles on roller drum were used.

As a standard protocol, right side of the face was subjected to microneedling with PRP and left side of the face was treated with microneedling with vitamin C. The skin was stretched and microneedling was carried out in vertical, horizontal and both diagonal directions for about 4-5 times. PRP (2 ml; platelet concentration:

8-9 lakhs/ $\mu$ l) and vitamin C (2 ml; 15%) were applied on the right and left side of the face, respectively. The procedure was repeated 4-5 times in the above-said directions. Ice packs were applied over the treated areas. The subjects were instructed to follow strict photo-protective measures.

The patients were reviewed after 1 week for any side effects. A total of four similar sittings were done at intervals of 4 weeks each. At the end of four treatments, the scars were graded using grading system as used in the beginning. Photographs of both sides of the face were taken under consistent background, position and lighting and compared with the pre-treatment images. The improvement was rated as poor, good and excellent depending upon the change in grade of acne scars by both treating physician and the patient. An improvement by two grades was considered as excellent, 1 grade was rated as good and no up gradation on assessment was labelled as poor response.

Any adverse effect that occurred due to the treatment was noted down. Post procedure, antibiotic medication for 2-3 days, sun protection and regular usage of sunscreens was advised.

The collected data was entered in excel and analysed using appropriate statistical methods with SPSS 16.0.2. The significance of the outcome of the study was assessed by calculating the '*P*' value and a value less than 0.05 was taken as significant.

## RESULTS

Twenty-seven out of the total 30 patients completed the treatment schedule. Two patients were lost to follow up and one dropped out due to severe post inflammatory hyperpigmentation. Male patients (70%) outnumbered female patients. Age of patients ranged from 18 to 34 years with a mean of 27.5 years.

Out of 30 patients, 23 achieved reduction in scarring by one or two grades. As shown in Figure 1, excellent response was seen in five (18.5%) patients with PRP as compared to two (7%) patients who received treatment with vitamin C according to physician's assessment. As far as up gradation by one score is considered, i.e., good response, it was similar in both cases. Vitamin C did not prove to be as efficacious as PRP since 10 (37%) patients had poor response in vitamin C-treated area compared to only 6 (22.2%) patients who underwent PRP therapy, but vitamin C proved to be efficacious in dealing with post inflammatory hyper-pigmentation secondary to acne ( $P = 0.021$ ). Patients assessment was recorded and graph was plotted [Figure 2]; they were more satisfied with PRP as compared to vitamin c ( $P = 0.01$ ). Figures 3-7 illustrate the clinical response to the treatment with PRP and vitamin C.

**DISCUSSION**

Acne by definition is a multifactorial chronic inflammatory disease of pilosebaceous unit, clinically characterised by the presence of comedones, inflammatory papules, pustules and sometimes nodules

and cysts. It commonly occurs during adolescence and cause great psychological stress.<sup>[1,2]</sup> Unfortunately, acne scarring is common and occurs easily in the course of the disease. It is one of the most common causes of facial scarring and treating acne scar is one of the most challenging cosmetic procedures.<sup>[3]</sup>

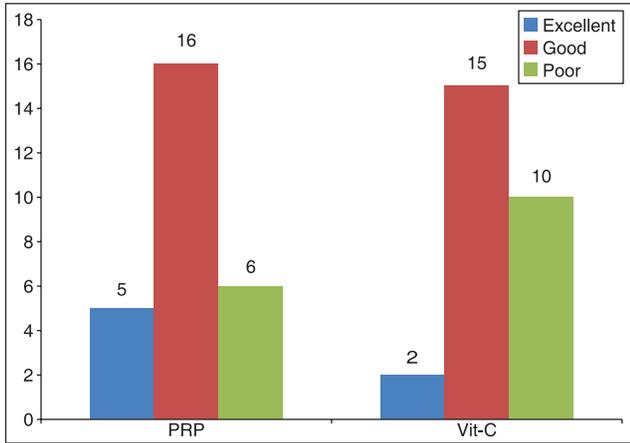


Figure 1: Graphical representation of outcome with PRP and vitamin C as assessed by treating physician

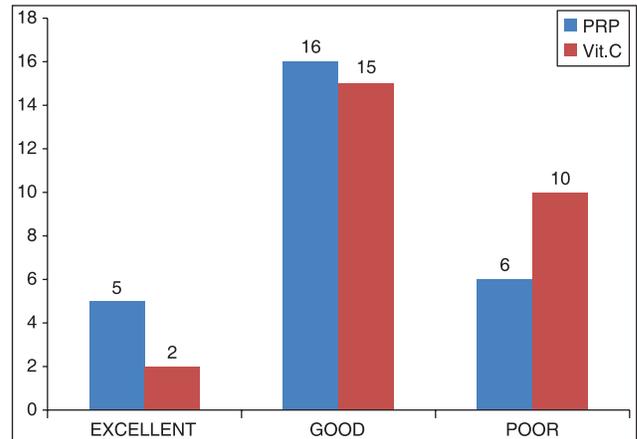


Figure 2: Graphical representation of patient assessment of outcome with PRP and vitamin C



Figure 3: Serial photographs of a 24 year old male treated with dermaroller and PRP



Figure 4: Serial photographs of a 24 year old female treated with microneedling and PRP



Figure 5: Serial photographs of a 25 year old male treated with microneedling and PRP

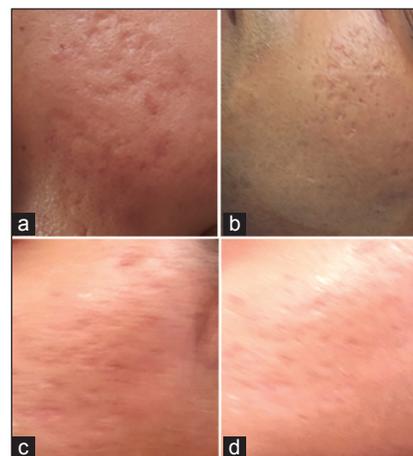


Figure 6: Serial photographs of a 25 year old male treated with dermaroller and vitamin C



**Figure 7: Pre and post treatment photographs of a patient treated with dermaroller and vitamin C**

Classification of acne scars is essential to assess the severity of cosmetic disfigurement and to choose the therapeutic intervention necessary.<sup>[4]</sup> Broadly acne scars are classified into atrophic and hypertrophic scars. Atrophic scars have been further classified as ice pick, rolling and box car.<sup>[5]</sup> The European acne group (ECCA) has renamed the atrophic acne scars as V-shaped (ice-pick), U-shaped (box car), and W-shaped (rolling).<sup>[6]</sup> Goodman and Baron encompassed all the morphological types of post acne scars and used simple clinical examination as the tool to grade the scars on objective lines.<sup>[7]</sup>

Grading of the atrophic scars as per Goodman and Baron scale is as below:

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

Atrophic facial scars are always a challenge to treat. Microneedling or Microneedling therapy is a new addition to the treatment armamentarium for such scars. It is a simple, inexpensive office procedure with no downtime.<sup>[8]</sup> In a study conducted by Imran Majid, 36 out of 37 patients showed good response to microneedling treatment.<sup>[9]</sup> At the same time, PRP has been used for various surgical and medical ailments. PRP along with microneedling would intensify the natural wound healing cascade because of the high concentration of patients own growth factors. It acts synergistically with growth factors induced by skin needling in order to enhance the wound healing response. PRP contains several growth factors, including platelet-derived growth factor, transforming growth factor B and vascular endothelial growth factors. Vitamin C has been shown to stimulate both

type I and type III collagen synthesis and is well known for its antioxidant properties.

Redaelli *et al.* conducted a study for 3 months with 23 patients and concluded that PRP is a promising, easy to perform technique for face and neck rejuvenation and scar attenuation.<sup>[9]</sup>

Fabbrocini *et al.* conducted a study and found that PRP combined with microneedling was more effective in acne scars than microneedling alone.<sup>[10]</sup>

Farris reported that topically applied vitamin C stimulates the collagen producing activity of the dermis and leads to the clinical improvement in photoaged skin with respect to firmness, smoothness and dryness.<sup>[11]</sup>

## CONCLUSION

PRP combined with microneedling is a better treatment option than microneedling with vitamin C in treating atrophic acne scars.

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