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EFFICACY OF MICRONEEDLING ALONE VERSUS MICRONEEDLING IN COMBINATION WITH SUBCISION AND BIOFILLER INSERTION IN ATROPHIC ACNE SCARE: A SPLIT FACE STUDY

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Abstract

Background: *Atrophic acne scars are a common cosmetic concern that significantly impact individuals' quality of life. Various treatments, including microneedling, subcision, and biofiller insertion, have been developed to improve scar appearance. However, the comparative efficacy of microneedling alone versus its combination with subcision and biofiller remains underexplored. This split-face study aimed to evaluate the efficacy of microneedling alone compared to microneedling combined with subcision and biofiller insertion in the treatment of atrophic acne scars.*

Methods: *A total of 70 participants aged 18–40 years with bilateral atrophic acne scars (Goodman and Baron score ≥3) were enrolled in the study and divided in two groups. Each participant of both groups received microneedling on right side of the face (control) and a combination of microneedling, subcision, and PRP (combination) on the left side. Treatments were performed at 1 month interval for 4 sessions followed by two follow ups , each 3 months apart from last session. Outcomes were assessed using the GBS, patient satisfaction survey and observation of side effects.*

Results: *The combination side (left side of face) showed a significantly greater reduction in GBS compared to the control side (left side of face). Patient satisfaction was higher for the combination therapy, with 70% of participants reporting substantial improvement Both treatments were well-tolerated, with only mild post-inflammatory hyperpigmentation and bruising reported.*

Conclusion: *The combination of microneedling, subcision, and PRP demonstrated superior efficacy and patient satisfaction compared to microneedling alone in treating atrophic acne scars. This multimodal approach provides a safe and effective option for scar management.*

INTRODUCTION

Atrophic acne scars, a challenging dermatological condition resulting from destruction of collagen and elastic fibers due to inflammatory acne lesions. They manifest as depressed areas on the skin and significantly affect patients' psychological well-being, and social interactions.[1] Various treatment options for atrophic acne scars include microneedling (MN), subcision, laser resurfacing, punch excision, chemical peels, dermal fillers, grafts, TCA cross, microdermabrasion, and platelet-rich plasma (PRP).[2]

Microneedling (MN), is a minimally invasive technique that uses fine needles to create controlled micro-injuries in the dermis which stimulates natural wound-healing process, promoting collagen and elastin production.[3] It improves skin texture, reduces depth of scars, enhances overall appearance as well as absorption of topical treatments.[4] Recent studies have demonstrated the effectiveness of microneedling in reducing acne scars, with significant improvements noted in various scar types, including rolling and boxcar scars.[5-7]

Subcision is a minor surgical procedure in which a special needle (e.g., Nokor needle 18G) is inserted under the skin to release fibrotic bands that tether the scar to deeper layers of tissue and allowing the skin to rise to a more natural level and also stimulating collagen production.[8,9] Biofiller such as platelet poor Plasma , add volume and enhance collagen remodeling, making them a valuable adjunct in scar treatment.[10-12]A study done by Bhatt, et al showed a varied response rate to biofiller [13,14] while another study by Bhargava, S., et al showed a 95.6% efficacy with regards to subcision and microneedling [15].

This study employs a split-face design to directly compare microneedling alone with its combination with subcision and biofiller insertion, providing a unique opportunity to assess the efficacy, safety, and patient satisfaction of these approaches within the same individual. By generating evidence on the benefits of this multimodal approach, this research aims to guide clinicians in optimizing treatment protocols for atrophic acne scars, improving both clinical outcomes and patient quality of life.

Methodology The study was conducted from January 2024 to June 2024 at the outpatient department of dermatology, Pak Emirates Military Hospital Rawalpind. The sample size was calculated by using the WHO sample size calculator based on an estimated prevalence of 50%, a margin of error of 5%, with a confidence interval of 95%, 80% power of the test, and a 5% level of significance. Ethical approval was obtained from the institutional review board (A/28/ERC /39/2025). All selected candidates were briefed about the procedure prior to start of study and written consent form was signed by all candidates. Routine investigations were performed, including complete blood count, bleeding and clotting time, fasting blood glucose, hepatitis B surface antigen, and human immunodeficiency virus test. Clinical photographs were taken

Inclusion criteria: Patients of ages 18–40 years with Fitzpatrick skin types III–V, bilateral atrophic acne scars (Grades 3–4, Goodman and Baron scale) and no prior scar treatments within six months of commencement of study.

Exclusion criteria: Patients with active acne lesions, keloidal tendencies, systemic dermatological conditions, history of hypersensitivity to any of biofillers, pregnant and lactating women and undergoing anticoagulant therapy.

To minimize bias, a split-face design was employed, where each participant's face was divided into two halves. Right side of the face was treated with microneedling alone, while the left side received a combination treatment consisting of microneedling, subcision and biofiller insertion.

Both sides of the face was cleansed with normal saline and 4-5% Lidocaine was applied over the area to be treated and left for 60 minutes. After cleaning the area, microneedling was performed on right side and microneedling in combination with subcision and biofiller insertion was performed on left side. Microneedling was performed by using hand-held motorized microneedling device at speed of 60-90 cycles per

sec with 33-gauge 12 micro-sized needle cartridge is used with depth of 1.5–2.0 mm. 10–12 passes were made in horizontal, vertical and diagonal directions, in a uniform manner. The treatment was stopped at punctate bleeding over treated area. For subcision, a 18G-gauge needle (nokor needle) was used. After being bent, the needle was inserted at a 30° angle into the mid-to-deep dermis. The needle was moved back and forth in the horizontal plane. in a fan-like motion and the motions were continued until the sound and sensation of bands breaking were gone. Squeezing the surrounding skin and subcutaneous tissue forced accumulated blood through the needle's opening. The needle was placed 1-2 mm in front of the scar at a 30°–45° angle, with the pointed end pointing down, to introduce the biofiller. To ensure uniform filling of the scar, the filler was injected under each indicated scar at the level of the dermo–hypodermal junction, and the needle was progressively withdrawn while injecting the filler till the exit point. To keep the surrounding tissue's contour, the region was gently massaged. The patient was told not to apply pressure to the treated area for a week and not to use ice packs as this could disrupt platelet function. Both procedures were done in four sittings at intervals of 1 month and two follow ups after 3rd and 6th month of last procedure. The effectiveness of the two interventions was evaluated by Goodman and Baron scale (GBS).[22] Side effects were recorded on every visit; Dermatological Life Quality Index (DLQI) and patient satisfaction was recorded each time. Patient satisfaction is reported between 1 (not satisfied) and 10 (highly satisfied) upon treatment completion.23

Data Analysis

Data was analyzed using SPSS (v.25). Continuous variables were expressed as mean ±SD and compared using paired t-tests or ANOVA. Categorical variables were compared using chi-square tests. A p-value <0.05 was considered statistically significant.

Results

The demographic details of all subjects enrolled in the study are represented in Tab

Demographics		
Gender	Male	28 (40%)
	Female	42 (60%)
Duration of acne	<1 year	8 (11.4%)
	1-2 years	20 (28.6 %)
	2-5 years	36 (51.4%)
	>5 years	6 (8.6%)
Marital Status	Married	36 (51.4%)
	Unmarried	34 (48.6%)
Residence	Rural	46 (65.7%)
	Urban	24 (34.3%)
Dominant Scar Morphology	Icepick	13 (18.6%)
	Rolling	29 (41.4%)
	Boxcar	28 (40.6%)

This data indicates that a greater number of females were affected by acne scar than males, furthermore majority of the subjects belonged to rural area and rolling and box-car scar morphologies were dominant with icepick morphology appearing to be least prominent one. The GBS score for combination and control treatment is represented in table 2.

Table 2: A comparison of GBS scale of control and combination treatment of acne during different sessions of treatment.

Duration of Treatment	GBS		
	Right side of face	Left side of face	p-value
Base line (Month 0)	3.82±0.61	3.79±0.57	0.87
1st Month	3.7 ± 0.4	3.5 ± 0.3	0.009
2nd Month	3.5 ± 0.6	3.2 ± 0.4	0.005
3rd Month	3.2 ± 0.5	2.8 ± 0.3	0.033
4th Month	2.9 ± 0.4	2.5 ± 0.3	0.01
7th Month (1st follow up)	2.7 ± 0.3	2.2 ± 0.2	0.005
10th Month (2nd follow up)	2.5 ± 0.62	2.0 ± 0.1	0.03

The table 2 indicates that both right (control) and left (combination) sides showed improvement however left side showed more significant improvement.

The subjects reported improved skin texture and decrease in oiliness. The subjects reported more improvement on combination side of face. The combination side reported temporary bruising as side effect of combination therapy; this temporary bruising subsided after 2-3 days of procedure. Among all subjects, post-inflammatory hyperpigmentation and tram track scarring was observed on combination treatment side of face. As such, there was no significant difference in side effects among the two groups (p= 0.94).

The DLQI score was significantly lower after last session and was observed to be further decreased after 2nd follow up. Interestingly, the DLQI score was observed to be higher in females than in males (Figure 1).

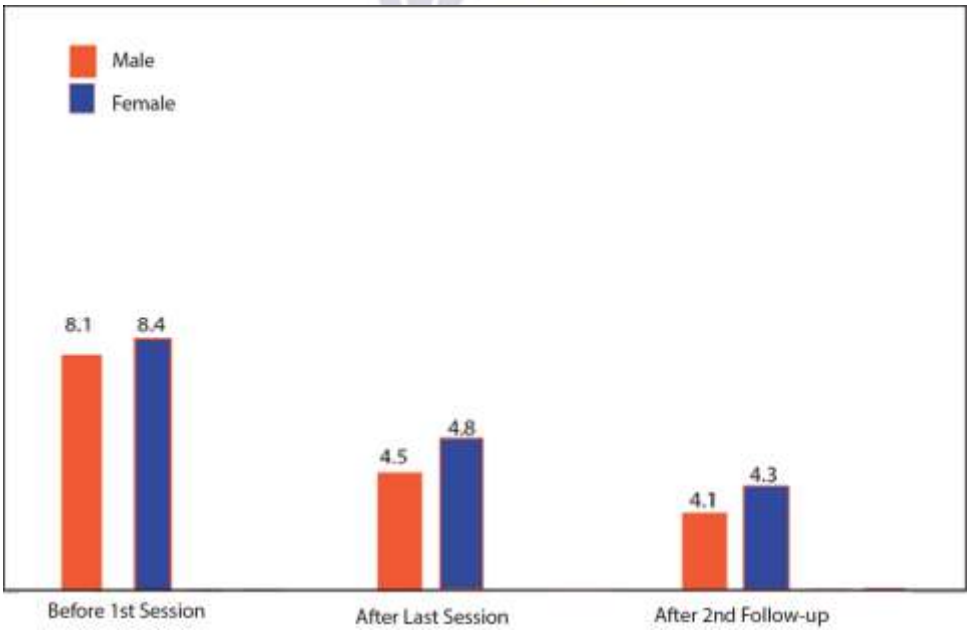

Figure 1: DLQI score before and after treatment

More than 70% of the subjects reported that they were more than satisfied with the outcome of combination therapy over control treatment. Less than 10% preferred control therapy due to bruises that were observed due to subcision used in combination therapy (Figure 2).

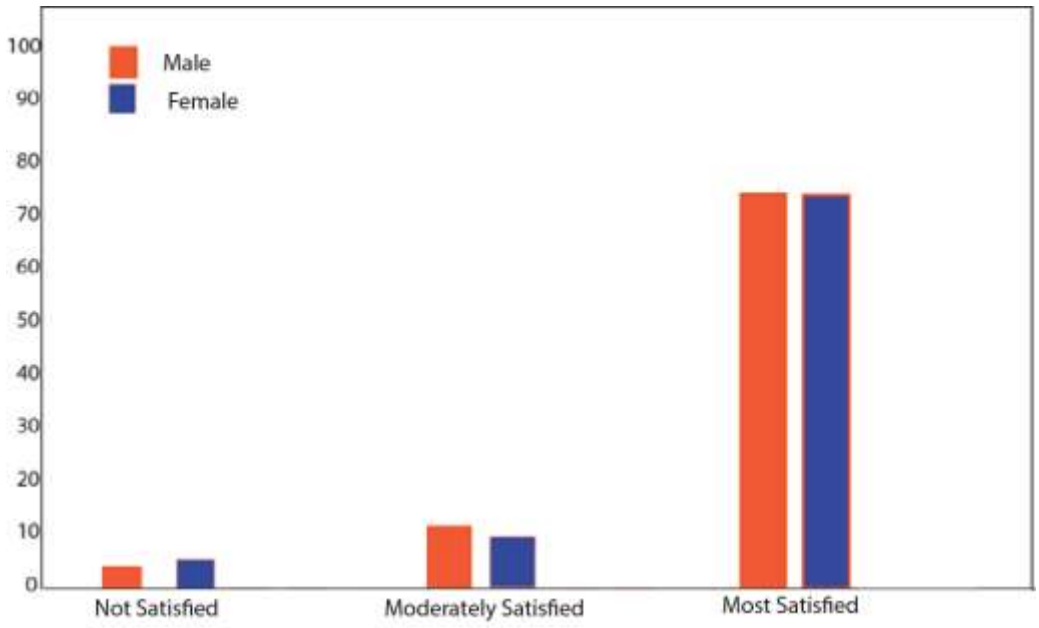

Figure 2: Survey on effectiveness of combination therapy

Discussion

Acne scars has profound effects on the psyche of the sufferer as these appear as skin irregularity and negatively effect skin appearance. So far, the number of studies on evaluating perception of scar severity and treatment of such skin modalities are very limited. Microneedling (MN) is commonly used treatment option for treating/managing acne scars. The studies that involve use of MN in combination with other modalities are very limited. The present study was undertaken to evaluate the effectiveness of MN alone and when used in combination with subcision and biofiller insertion. For this purpose, a split face study was designed involving 70 subjects from Rawalpindi district. . (Our observations are consistent with those reported by Gupta et al (2021).[24)]

Our study reflected that acne scars are more prevalent in females than in males and married subjects were observed to be more prone towards acne. These observations of our study is consistent with Alsaedy etal (2017),[25] Porwal etal (2018),[26] and Dogra et al (2014)[27]. The subjects of the present study presented rolling and box car scar morphology to be dominant which is also consistent with findings of Amer et al (2020)[16] and Dogra etal (2014).[27] Whereas Bano etal (2023) have reported mixed morphologies to be dominant form of acne as compared to individual types.[28]

The treatment of acne scars with MN alone and in combination both yielded good results with significant improvement however, results with combination treatment were significantly better than alone. These studies are consistent with findings of Bano etal (2023)[28] whereby the authors used Hyaluronic Acid as filler where as in our case we used PPP as biofiller.

Our study indicates gradual improvement in scars with sessions of both treatments. After 2nd follow-up, the GBS score for right side showed 34.6% reduction in score whereas the reduction was 47.2% was observed in case left side. The study by Bano etal (2023)[28] reported reduction of 39.06% at end of 17 week whereas Amer etal (2020)[16] reported 82.9% improvement using hyaluronic acid as filler. Sharad etal (2011) reported 31% improvement with MN and 60% improvement after 5 sessions with combination therapy using glycolic acid peels in a split face study.[8] Ibrahim etal (2018) in a split face study used PRP as part of combination therapy.[29] The authors also reported combination therapy to be superior to that of PRP. However, the authors didn't explore the difference in response of gender in acne treatment.

The improvement of acne scars by using combination treatment is also supported by Alsaedy[25] who reported use of hyaluronic acid to be reported with faster recovery time and reduced side effects. These reports were based on use of hyaluronic acid as filler whereas in our case, we used biofiller.

The subjects also reported satisfaction over use of combination therapy with fewer number of subjects reporting lack of satisfaction which was mainly attributed to the bruises that appeared during subincision.

Limitations

Small sample size and selection of subjects from only Rawalpindi area limit the generalizability and diversity of sample. The study involved subcision and biofiller insertion after microneedling; therefore the claim of role of biofiller in treatment/improvement of acne scars cannot be ascertained. The follow up was for 6 months and long-time side effects (if any) were not studied. Different reports have used upto 5 settings whereas we have used 4 settings. The study on longer treatment durations and using different volumes of PRP in future would be helpful in evaluating the effectiveness of the two strategies.

Conflict of interest: The authors declare no conflict of interest.

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Author Contribution: methodology, original writeup (abbreviation of name, eg T for Tabinda); supervision, editing and proof reading (abbreviation of names), editing (abbreviation of names), data collection (abbreviation of names).

Conclusion

The present study represented comparison of miconeedling and combination of subincision, microneedling and PRP for treatment of acne scars. This split face study indicates the combination therapy to be more effective than control therapy which involved use of microneedling alone which was reflected both by GSGS and GBS scales. The study indicates acne scar to be more prevalent in female and married subjects more prone to acne than the unmarried subjects. The results of the study were supported by decrease in DLQI score and patient satisfaction survey.

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