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Combination treatment for acne scars Subcision with blunt cannula, platelet-rich plasma injections, and microneedling

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Abstract
Background: Subcision is a minimally invasive office procedure utilized for treating depressed acne scars. It involves utilizing a needle or cannula to release fibrotic tissue beneath the skin, improving scar appearance without requiring a traditional incision.
Aim: Our objective was to assess the effectiveness of combining subcision with a blunt cannula, platelet-rich plasma injections, and microneedling for post-acne rolling scars treatment.
Methods: This pilot clinical trial was executed on 50 patients aged from 18 to 40 years, suffered from mild to severe rolling acne scars on their face. With exclude patient under treatment of acne for 4-6 weeks. Using of blunt cannula, no 25 gauge in subcision followed by PRP injection by the cannula in the same session followed by micro needling.
Results: There was significant positive correlation between physician satisfaction with age of onset of acne. Whereas, there was significant negative correlation between physician satisfaction with types of scars (p<0.05). Also, there was significant positive correlation between patient satisfaction with age and types of scars. Whereas, there was significant negative correlation between patient satisfaction with any previous types of acne and physician satisfaction (p<0.05). Controversy, there were no significant correlations between physician and patient satisfaction with other parameters (p>0.05).
Conclusions: The synergistic combination of platelet-rich plasma and subcision demonstrates enhanced efficacy in treating depressed acne scars. The application of plasma gel serves as a cost-effective and safe filler material that helps minimize the likelihood of scar recurrence following subcision procedures. When used together, these techniques provide superior outcomes in addressing atrophic post-acne scarring.

Keywords: Acne scars subcision, blunt cannula, PRP injection, microneedling

Introduction

Acne represents a prevalent skin condition that can result in significant cosmetic concerns due to the diverse morphology and depth of resulting scars. The therapeutic approach for these scars varies depending on the extent and **Error! Bookmark not defined.**When utilized as a supplementary therapy, it helps to reduce the overall number of treatment sessions needed for optimal results [5].

Micro needling is one the several option for acne scars improvement. A small handheld device is utilized the outermost layer of the epidermis, revealing smoother and more even-toned skin beneath. De specialized roller or device with fine needles to create tiny punctures in the skin, triggering the produc This technique, often called microneedling, is also referred to as collagen induction therapy or p induction [6]. A significant number of people with acne develop damage beneath the skin's surface formation of saucer-like depressions or pits. In certain instances, the skin loses its underlying support, that connect the skin to the subcutaneous layer. These bands tug on the epidermis, creating a waxy, unev rolling scar [7].

Treating acne scars presents a therapeutic challenge and often requires multiple approaches usage. Su cannula has been recognized as an effective technique for addressing rolling acne scars.

Even so, despite its usefulness, subcision tends to offer mild to moderate results, as the recurrence rate certain post-procedure side effects.

Combination of subcision with PRP injection by using blunt cannula and using micro

brassion may improve the result [8].

We sought to estimate the result of utilizing subcision with blunt cannula in combination with injection of PRP and micro needling in post acne rolling scars treatment.

Materials and Methods

This pilot study is a clinical trial carried out on 50 patients, aged from 18 to 40 years, suffered from mild to severe rolling acne scars on their face (Grade 2–4) in accordance with Goodman and Baron's classification system. With exclude patient under treatment of acne for 4-6 weeks. The study protocol approval was done by Ethical Scientific Committee of Ahmed Maher hospital, Egypt. During the period from September 2019 up to January 2021. All subjects were volunteers who provided written informed consent after the study's objectives were clearly explained to them, prior to the commencement of the study.

Utilizing of blunt cannula, no 25 gauge in subcision followed by PRP injection by the cannula in the same session followed by micro needling.

Participants with active acne or infectious diseases, including herpes simplex, HIV, bacterial infections, warts, HCV-AB, HBV-Ag, actinic keratosis, or skin cancers, were not eligible for inclusion in the study.

All patients were subjected to history taking regarding: A specially designed sheet was utilized for all subjects participating in this study, comprising: [Demographic data as name, age, sex, address, residence, occupation, marital status and special habits. Any medical disease present or past and its nature, duration, treatment and any drug intake and its regimen and duration of intake. Age of onset. Previous types of acne. Type and number of sessions. Previous types of scars. Session of types of scars. Physician and patient satisfaction].

Platelet rich plasma preparation

Under strict sterile technique, 10cc of blood is drawn from the antecubital vein and collected in sodium citrate tubes (10:1 ratio). The blood undergoes a two-stage centrifugation process. The initial "soft" spin at 1419g for 7 minutes separates the plasma and nucleated cells from red and white blood cells. The resultant supernatant plasma, containing suspended platelets and potentially some buffy coat components, undergoes a second "hard" spin for 5 minutes. This step separates the plasma into two distinct layers: platelet-poor and platelet-rich portions. The lower 1-2cc portion (Representing approximately 10% of the initial blood volume) contains the concentrated platelet-rich plasma. Prior to administration, the PRP is activated with calcium chloride in a 10:1 ratio (0.1cc calcium chloride per 1cc PRP). Utilizing an insulin syringe, 0.1cc of the activated PRP is injected both intradermally and subcutaneously at each scar site.

Statistical analysis

Under strict sterile technique, 10cc of blood is drawn from the antecubital vein and collected in sodium citrate tubes (10: 1 ratio). The blood undergoes a two-stage centrifugation process. The initial "soft" spin at 1419 g for 7 minutes separates the plasma and nucleated cells from red and white blood cells. The resultant supernatant plasma, containing suspended platelets and potentially some buffy coat components, undergoes a second "hard" spin for 5 minutes. This step separates the plasma into two distinct layers: platelet-poor and platelet-rich portions. The lower 1-2cc portion (Representing approximately 10% of the initial blood volume) contains the concentrated platelet-rich plasma. Prior to administration, the PRP is activated with calcium chloride in a 10:1 ratio (0.1cc calcium chloride per 1cc PRP). Utilizing an insulin syringe, 0.1 cc of the activated PRP is injected both intradermally and subcutaneously at each scar site.

Results

Fifty participants their ages ranges from 22.00-44.00 years with means 30.42±5.36 years. While, most of the studied patients (88.0%) were females. The range of age of onset of acne of the studied patients was 13.00-20.00 years with mean15.46±2.02 years. While, (48.0%) of the studied patients had ordinary Treatment of acne, previously. Table 1

The range of number of treatment sessions of scars of the studied patients was 1.00-6.00 with mean 2.14±1.32. While, (36.0%, 48.0%, 58.0%) of the studied patients had rolling ice picks scars. Previously fractional treatment of scars and did subcision, derma pen and plasma session, respectively. The range of physician satisfaction was 0.00-90.00 with mean 63.20±24.11. While, (92.0%) of the studied patients were satisfied. Table 2

There was no significant difference between the studied groups regarding age, sex and age of onset of acne ($p>0.05$). Ordinary treatment of acne was significantly increased among scars treatment (subcision, derma pen and plasma) sessions groups, (69%) than subcision, (0%) and (Subcision and plasma) sessions groups (4%), ($p<0.05$). Table 3

Number of sessions for scars treatment was significantly increased among (Subcision, derma pen and plasma) sessions group than (Subcision and plasma) and Subcisionn sessions group. While, there was significant difference between the studied groups regarding types of scars, that rolling scar was the most frequent among Sub cession and (Sub cession and plasma) sessions groups than (Subcsion, derma pen and plasma) sessions groups ($p<0.05$). On the other hand, there was no significant difference between the studied groups regarding previous types of scars treatment, ($p>0.05$). Table 4

There were no significant differences between the studied groups regarding patient and physician satisfaction, ($p>0.05$). Table 5

Age was significantly increased among rolling scar group than rolling box scar, rolling ice picks scar, rolling ice picks box scar and box scar groups, ($p<0.05$). On the other hand, there was no significant difference between types of scars groups regarding sex and previous types of acne treatment, ($p>0.05$). Age of onset of acne was significantly increased among rolling box scar group than rolling scar, rolling ice picks scar, rolling ice picks box scar and box scar groups, ($p<0.05$). Table 6

Number of sessions for scars treatment was significantly increased among rolling box scar than rolling scar, rolling ice picks scar, rolling ice picks box scar and box scar groups. While, there was significant difference between types of scars groups regarding previous types of scars treatment and types of treatment sessions for scars ($p<0.05$). That fractional scar was the most frequent among rolling box scar, rolling scar and box scar groups than rolling ice picks scar and rolling ice picks box scar groups. While, subcision, derma pen and plasma were most frequent among rolling ice picks scar, rolling ice picks box scar and box scar groups than rolling box scar and rolling scar. Physician

satisfaction was significantly increased among rolling scar group than rolling box scar, rolling ice picks scar, rolling ice picks box scar and box scar groups, (p<0.05). On the other hand, there was no significant difference between types of scars groups regarding patient satisfaction, (p>0.05). Table 7

There were significant differences relations between physician satisfaction with types of scars and patient satisfaction, (p<0.05). On the other hand, there were no significant difference relations between physician satisfaction with any previous types of acne treatment, scars treatment and sessions types of scars tretment, (p>0.05). Table 8

Table 1: Demographic data, age of onset of acne and its previous treatment of the studied patients (N=50)

Variables		Studied cases (N=50)	
		Mean ±SD	Range
Age (years)		30.42±5.36	22.00-44.00
Age of onset of acne (years)		15.46±2.02	13.00-20.00
		No.	%
Sex	Male	6	12.0
	Female	44	88.0
Previous Treatment of acne	No	19	38.0
	Net look	6	12.0
	Roaccutane	1	2.0
	Ordinary	24	48.0

There was significant positive correlation between physician satisfaction with age of onset of acne. Whereas, there was significant negative correlation between physician satisfaction with types of scars (p<0.05). Also, there was significant positive correlation between patient satisfaction with age and types of scars. Whereas, there was significant negative correlation between patient satisfaction with any previous types of acne and physician satisfaction (p<0.05). Controversy, there were no significant correlations between physician and patient satisfaction with other parameters (p>0.05). Table 9.

Table 2: Type, previous treatment of scars, number, type of treatment sessions of scars, physician and patient satisfaction of the studied patients (N=50)

Variables	Studied cases (N=50)	
	No.	%
Types of scars		
Rolling box scar	6	12.0
Rolling scar	15	30.0
Rolling ice picks scar	18	36.0
Rolling ice picks box scar	7	14.0
Box scar	4	8.0
Previous treatment of scars		
No	18	36.0
Fractional	24	48.0
Derma pen	2	4.0
Fractional and derma pen	6	12.0
Type of treatment sessions of scar		
Subcision	2	4.0
Subcision and plasma	19	38.0
Subcision, derma pen and plasma	29	58.0
Number of treatment sessions for scars	Mean ± SD	Range
	2.14 ± 1.32	1.00–6.00
Physician satisfaction	63.20 ± 24.11	0.00–90.00
Patient satisfaction		
Very satisfied	4	8.0
Satisfied	46	92.0

Table 3: Demographic data, age of onset of acne and its previous types of acne treatment in relation to types of scars treatment among the sessions groups

Variables	Sessions groups						K	P value
	Subcision N=2		Subcision and plasma N=19		Subcision, derma pen and plasma N=29			
Age/year								
Mean ±SD	31.00±0.00		33.00±3.70		28.69±5.81		2.218	0.089
Range	31.00-31.0		27.00-39.00		22.00-44.00			
Age of onset of acne								
Mean ±SD	16.00±0.00		15.53±2.34		15.38±1.90		0.101	0.904
Range	16.00-16.0		13.00-20.00		13.00-19.00			
Sex	No.	%	No.	%	No.	%	X^2	
Male	0	0.0	0	0.0	6	21	4.937	0.085
Female	2	100	19	100	23	79		
Previous types of acne treatment								
No	2	100	11	57.9	6	21	15.67	0.016*
Net look	0	0.0	4	21.1	2	7		
Roaccutane	0	0.0	0	0.0	1	3		
Ordinary	0	0.0	4	21.1	20	69		

*: Significant, p value <0.05. K: Kruskal Wallis test. X^2: Chi-square test 0.05.

Table 4: Type, number of sessions for scars treatment and previous types of scars treatment in relation to treatment among the studied groups

Variables	Sessions groups						X^2	P value
	Sub cession N=2		Sub cession and plasma N=19		Sub cession, derma pen and plasma N=29			
	No.	%	No.	%	No.	%		
Types of scars								
Rolling box scar	0	0.0	2	10.5	4	14	19.316	0.013*
Rolling scar	2	100	10	52.6	3	10		
Rolling ice picks scar	0	0.0	7	36.8	11	38		
Rolling ice picks box scar	0	0.0	0	0.0	7	24		
Box scar	0	0.0	0	0.0	4	14		
Previous types of scars treatment								
No	0	0.0	9	47.4	9	31	8.870	0.181

Fractional	2	100	10	52.6	12	41		
Derma pen	0	0.0	0	0.0	2	7		
Fractional and derma pen	0	0.0	0	0.0	6	21		
Number of sessions for scars treatment								
Mean ±SD	1.00±0.00		1.11±0.32		2.90±1.26		F= 19.992	<0.001*
Range	1.00-1.00		1.00-2.00		1.00-6.00			
Post Hoc	P1=0.887, P2=0.012*, P3<0.001*							

*: Significant, $p<0.05$. X^2: Chi-square test

Table 5: Physician and patient satisfaction in relation to treatment among the studied groups

Variables	**Sessions groups**						**K**	**P value**
	Sub cession N=2		**Sub cession and plasma N=19**		**Sub cession, derma pen and plasma N=29**			
Patient satisfaction	**No.**	**%**	**No.**	**%**	**No.**	**%**	X^2 0.387	0.824
Very satisfied	0	0.0	2	10.5	2	7		
Satisfied	2	100	17	89.5	27	93		
Physician satisfaction								
Mean ±SD	80.00±0.00		63.68±14.61		61.72±29.29		0.533	0.590
Range	80.0-80.00		40.00-90.00		0.00-90.00			

*: Significant, $p<0.05$. K: Kruskal Wallis test. X_2: Chi-square test

Table 7: Types of scars in relation to type, number of treatment sessions of scars , previous types of scars treatment, physician and patient satisfaction

Variables	**Types of Scars**										**X^2**	**P value**
	Rolling box scar N=6		**Rolling scar N=15**		**Rolling ice picks scar N=18**		**Rolling ice picks box scar N=7**		**Box scar N=4**			
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**		
Previous types of scars treatment												
No	4	66.7	4	26.7	8	44.4	2	28.6	0	0.0	29.28	**0.004***
Fractional	2	33.3	11	73.3	6	33.3	1	14.3	4	100		
Derma pen	0	0.0	0	0.0	0	0.0	2	28.6	0	0.0		
Fractional and derma pen	0	0.0	0	0.0	4	22.2	2	28.6	0	0.0		
Types of treatment Session of scars												
Subcisionn	0	0.0	2	13.3	0	0.0	0	0.0	0	0.0	19.32	**0.013***
Subcision and plasma	2	33.3	10	66.7	7	38.9	0	0.0	0	0.0		
Subcision, derma pen and plasma	4	66.7	3	20.0	11	61.1	7	100	4	100		
Number of sessions for scars types												
Mean ±SD	15.46±2.02		2.00±0.00		1.40±0.83		2.22±1.26		3.71±1.98		F= 4.841	**0.002***
Range	13.00-20.00		2.00-2.00		1.00-3.00		1.00-4.00		1.00-6.00			
Post Hoc	P1=0.288, P2=0.685, P3=0.011*, P4=NA, P5=0.048, P6<0.001*, P7=0.361, P8=0.006*, P9=0.730, P10=0.022*											
Physician satisfaction												
Mean ±SD	66.67±20.66		78.00±9.41		50.00±30.68		70.00±16.33		50.00±0.00		4.031	**0.007***
Range	40.00-80.00		70.00-90.0		0.00-90.00		50.00-90.00		50.00-50.0			
Post Hoc	P1=0.283, P2=0.108, P3=0.783, P4=0.238, P5=0.001, P6=0.422, P7=0.026, P8=.043, P9=NA, P10=0.146											
Patient satisfaction												
Very satisfied	2		33.3		2		13.3		0		0.0	0
Satisfied	4		66.7		13		86.7		18		100	7

*: Significant, $p<0.05$

Table 8: Relation between physician satisfaction with the studied parameters

Variables	**Physician satisfaction**			**K**	**P value**
	Mean ±SD	**Range**	**Median**		
Types of scars				4.031	**0.007***
Rolling box scar	66.67±20.66	40.0-80.0	80.00		
Rolling scar	78.00±9.41	70.00-90.0	70.00		
Rolling ice picks scar	50.00±30.68	0.00-90.00	55.00		
Rolling ice picks box scar	70.00±16.33	50.00-90.0	60.00		
Any previous types of acne treatment				1.472	0.234
No	64.21±11.70	50.0-80.00	70.00		
Net look	76.67±10.33	70.0-90.00	70.00		
Ordinary	57.92±31.62	0.00-90.00	60.00		
Any previous types of scars treatment				1.012	0.396
No	68.89±14.91	50.00-90.0	70.00		
Fractional	57.08±30.43	0.00-90.00	70.00		

Derma pen	65.00±21.21	50.00-80.0	65.00		
Fractional and derma pen	70.00±15.49	60.00-90.0	60.00		
Session types of scars treatment				U= 0.533	0.590
Subcision and plasma	63.68±14.61	40.00-90.0	70.00		
Subcision, derma pen and plasma	61.72±29.29	0.00-90.00	60.00		
Patient satisfaction				U= 5.165	<0.001*
Very satisfied	85.00±5.77	80.00-90.0	85.00		
Satisfied	61.30±24.19	0.00-90.00	65.00		

*: Significant, $p<0.05$

Table 9: Correlation between physician and patient satisfaction with the studied parameters

Variables	Physician satisfaction		Patient satisfaction	
	R	p-value	r	p-value
Age (years)	-0.049	0.737	0.350	0.013*
Sex	0.143	0.322	-0.109	0.452
Age of onset of acne (years)	0.552	<0.001*	-0.135	0.351
Types of scars	-0.338	0.016*	0.357	0.011*
Any previous types of acne	-0.004	0.975	-0.291	0.040*
Any previous types of scars	-0.054	0.712	0.123	0.397
Number of sessions for scars types	-0.088	0.542	0.129	0.372
Session of types of scars	0.019	0.897	0.035	0.807
Physician satisfaction	NA	-----	-0.327	0.021*
Patient satisfaction	-0.327	0.021	NA	---

r: pearson correlation. *: Significant, $p<0.05$

Fig 1: Female patient 28 years, with rolling and box scars, 60% of improvement

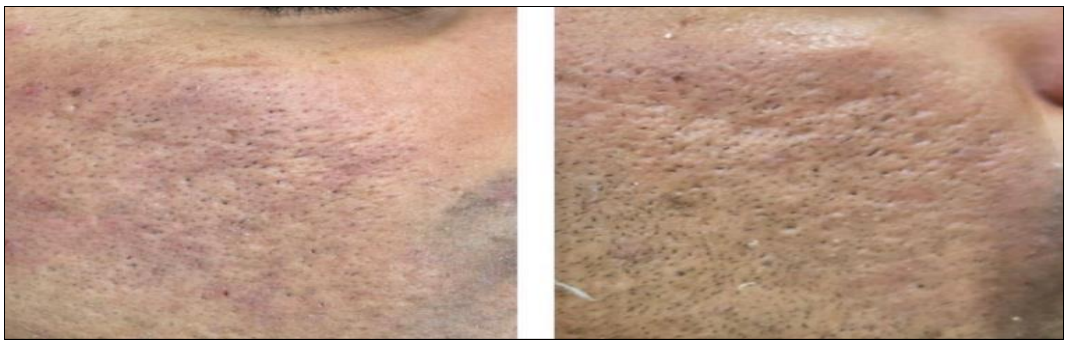

Fig 2: Male patient 35 years, rolling and icepick scars, 81% of improvement

Cases

Case 1: Female patient 28 years, with rolling and box scars, 60% of improvement. Figure 1

Case 2: Male patient 35 years, rolling and icepick scars, 81% of improvement. Figure 2

Discussion

Acne represents a widespread skin condition that frequently leads to significant cosmetic concerns, as the resulting scars can present with varying morphologies and depths. The management approach for these scars is determined by both the pattern and intensity of tissue damage that persists after the initial lesions have healed. Among the available therapeutic options, subcision has demonstrated particular effectiveness as a treatment modality, especially for addressing deep rolling acne scars through its mechanism of breaking underlying fibrous attachments [9].

The present study observed that, number of sessions for scars types was significantly increased among (Sub cession,

derma pen and plasma) sessions group than (Sub cession and plasma) and Sub cession sessions group. While, there was significant difference across the studied groups regarding types of scars, that rolling scar was the most frequent among Sub cession and (Sub cession and plasma) sessions groups than (Sub cession, derma pen and plasma) sessions groups (p<0.05). Controversy, there was no significant difference across the studied groups regarding previous types of scars, (p>0.05).

In this concern, in accordance with Porwal *et al*. [10], most patients presented with a combination of ice pick, boxcar, and rolling scars, which made up 47.27% of the cases, while the second most common type was a combination of ice pick and boxcar scars. In accordance with Jacob *et al*. [11], ice pick scars comprise 60% to 70% of the total scar types, with boxcar scars constituting 20% to 30%, and rolling scars making up 15% to 25%. Also, in accordance with Bhargava *et al*. [12], rolling and boxcar scars showed noticeable improvement, whereas ice pick scars exhibited only minimal changes.

Based on current literature, no standalone study has examined the correlation between the number of PRP and RF sessions and treatment outcomes for acne scarring. While the standard protocol recommends four sessions spaced fifteen days apart, some patients require annual maintenance of one to four sessions.

Elfar and Hasby, [13] investigated the effectiveness of plasma gel injection versus topical application combined with dermaroller treatment for atrophic post-acne scars. Their findings showed superior results with combination therapy, with notable improvements observed after a single plasma gel injection session. However, unlike our current study, their methodology did not employ a split-face analytical approach.

The process of needling promotes ongoing collagen formation that extends several months post-procedure, suggesting lasting benefits for acne scar treatment [14]. Since this technique preserves melanocytes by avoiding epidermal damage, it's particularly suitable for individuals with darker skin tones. The mechanism involves stimulation of TGF-β3, which provides anti-inflammatory benefits, and TGF-β1, which regulates pigment production through tyrosinase suppression [15].

The absence of post-inflammatory hyperpigmentation following needling procedures can be attributed to these mechanisms, provided patients adhere to post-treatment guidelines including sun protection measures and avoiding photosensitizing medications. The combined effect of dermal microinjury from needling and platelet activation leads to the release of growth factors and cytokines, which fundamentally alters the natural wound healing cascade from the inflammatory phase through collagen production, ultimately facilitating the restructuring of acne scars.

In our present investigation, patient and physician satisfaction scores showed no statistically significant variations across the study groups (p>0.05). This aligns with earlier research by Al-Hammamy and colleagues, [16] who found that approximately 50% of their subjects reported moderate satisfaction with the procedure. Their six-month follow-up revealed that 19% of patients perceived minimal impact from their scars, while 50% reported mild botheration. Regarding adverse effects, temporary manifestations comprising erythema, bruising, and swelling were commonly observed, with complete resolution occurring by the 12-week post-treatment mark.

On comparing our results to previously published studies, Alam *et al*. [17] evaluated the efficacy of subcision for the treatment of rolling acne scars in 40 patients. They demonstrated that subcision was an effective method for improving depressed scars. However, evaluation depended on investigator rating and patient satisfaction.

Balighi *et al*. [18] employed subcision to treat depressed acne scars in a study involving 22 patients. Their findings suggested that subcision appeared to be a safe technique for improving rolling acne scars, with benefits lasting over an extended period. Additionally, Vaishnani [19] noted that the outcomes of subcision become more pronounced between 2 and 6 months post-treatment. This improvement over time is attributed to the ongoing nature of scar remodeling, which continues for at least 2 years after the initial wound.

Deshmukh *et al*. [5] performed a split-face study on 12 patients, evaluating acne scar severity on a 10-point scale. They found that combining PRP with skin microneedling resulted in a 45% improvement in acne scars, compared to a 35% improvement from skin microneedling alone. The current authors' findings, showing a 45.28% improvement in patients' subjective scores, align with these results. This suggests that PRP appears to enhance the effects of both subcision and microneedling to a similar degree. Consequently, PRP can be effectively used with subcision when microneedling is not an available or viable option.

Previous research has demonstrated that subcision is highly effective for treating rolling-type scars. This technique works by severing the fibrous bands that anchor scars to the deep dermis, while also triggering a reactive fibrosis that gradually pushes depressed scars upward. In the authors' study, the more significant improvement observed in rolling- and box-type scars on the treatment side compared to the control side indicates that PRP may enhance subcision's effects. This enhancement likely occurs through PRP's ability to further stimulate collagen remodeling in the treated area.

Bhargava *et al*. [12] showed that combining subcision and needling with PRP can produce a synergistic effect. This enhanced outcome is likely due to the needling process improving PRP absorption. The growth factors released by PRP appear to optimize the healing process following subcision and needling procedures. As a result, this combination contributes to improved scar appearance and reduces the duration of post-treatment edema and erythema.

Needling not only stimulates new collagen production but also enhances PRP absorption. Studies have consistently shown that combining needling with PRP produces better outcomes than needling alone [20], with the exception of Ibrahim *et al*.'s study [21] This combination therapy may speed up wound healing due to the high concentration of autologous growth factors, increased protein synthesis, and enhanced collagen remodeling. Nandini *et al*. [22] noted that researchers have explored various combinations of treatment procedures to tailor approaches based on individual patient needs, considering both skin and scar types.

Recently, PRP has emerged as a promising treatment for atrophic acne scars, either on its own or in combination with microneedling. While many dermatologists and plastic surgeons have employed and evaluated this approach, results have varied between different medical centers.

A systematic review by Hesseler and Shyam [23] concluded

that incorporating PRP into treatment regimens significantly improved acne scars, boosted patient satisfaction, and reduced post-operative recovery time. Ibrahim *et al.* [24] found that treating acne scars with either combined microneedling and PRP or microneedling alone yielded satisfactory results. However, studies by El-Domyati *et al.* [20], Porwal *et al.* [10], and Chawla [25] demonstrated that combining dermaroller treatment with PRP produced superior outcomes compared to dermaroller treatment alone. Similarly, Al-aajem *et al.* [26] reported that the combined therapy of microneedling and PRP resulted in satisfactory responses.

In Al-aajem *et al.*'s study [26], some patients reported pain despite the use of topical anesthesia. Although precautions were taken, including applying topical antiseptics before the procedure and using topical antibiotics (fusidic acid cream for seven days) and sunscreen afterward, three patients developed folliculitis at the puncture sites from PRP or RF needles. The folliculitis manifested as small papules or pustules, with Staphylococcus aureus bacteria isolated. These cases were successfully treated with topical and systemic anti-staphylococcal antibiotics.

The authors recommend conducting further studies with larger sample sizes and extended follow-up periods to validate the findings of their research. Given the limited number of studies on minimally invasive multimodality therapies for severe acne scarring, this study may spark interest in developing safer treatment approaches using minimally invasive multimodality techniques for severe acne scarring.

Conclusions

PRP and RF microneedling have proven to be valuable options for treating atrophic acne scars, yielding excellent to good results in over 80% of patients with minimal side effects. The effectiveness of the treatment correlates directly with the number of sessions performed. Combining PRP with subcision produces a synergistic effect, enhancing the overall appearance of atrophic post-acne scars. This approach is both safe and straightforward. The combination of subcision, needling, and PRP can effectively treat severe atrophic acne scars. This cost-effective multimodality therapy requires relatively few sessions and is associated with high patient satisfaction and minimal recovery time. Subcision combined with autologous plasma gel injection has shown success in treating atrophic post-acne scars. The authors strongly believe that plasma gel is a safe, inexpensive, and effective filling material that can help prevent or reduce the risk of re-scarring following subcision.

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