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ORIGINAL ARTICLE

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Comparing cannula-based subcision with the common needle method: A clinical trial

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Abstract

Summary of trial design: Treatment of depressed acne scars requires multiple modalities. Although needle subcision is a valuable method, it exhibits mild to moderate efficacy in treatment of deep acne scars owing to the high recurrence rate and other side effects. A total of 100 patients with rolling acne scars were randomly treated using the standard technique of 18 gauge cannula and 27 gauge needle subcision in two parallel groups, and the effect of cannula subcision instead of needle subcision was evaluated in the treatment of rolling acne scars.

Methods: A total of 100 patients were randomly treated using the standard technique of 18 gauge cannula and 27 gauge needle subcision. The outcomes of these procedures were assessed by three blinded dermatologists and by patients' satisfaction.

Results: Subcision using the cannula showed good and very good improvement in about 83% of patients (n = 50, $P < .05$) based on dermatologists investigation and almost no side effects were observed in compared with needle subcision. The response rate was significantly different while using cannula subcision.

Conclusion: Cannula subcision appears to be a safe and practical technique that can enhance the efficacy of subcision without considerable complications.

KEYWORDS

acne, cannula, needle, scar, subcision

1 | INTRODUCTION

1.1 | Background

Numerous surgical modalities are being used to treat acne scars. Superficial procedures such as light chemical peels and microdermabrasion have shown limited results in treating depressed acne scars, although laser resurfacing procedures can resurface acne scars by ablating the epidermis and a part of the dermis and then facilitating remodeling of the skin.[1-4] Filler substances have similarly been applied with variable achievement rates to elevate deep scars.[5,6] Surgical modalities such as excision and punch grafting have been used in cases of dramatically changed scar morphology in some examined patients.[7,8] Subcision, also known as subcutaneous incisionless surgery, is a term described by Orentreich in 1995 to explain the surgical procedure for treating deep scars and wrinkles using a tri-beveled hypodermic needle inserted under the scarred area and moved back and forth, breaking up the scar tissue.[9] The principle of this procedure is to release the fibrotic strands that tether the scar to the underlying subcutaneous tissue, and this procedure generally decreases the depth of the scar depressions. The depression is lifted by the releasing action of the subcision surgery, as well as from the connective tissue and collagen that form during the course of wound healing.[9] This is a simple technique, but the primary problem is that surgery should be repeated several times in each deep area. Scar subcision plays an important

Identification number for the trial registration: IRCT20080901001159N22

role in "ice pick" and "rolling" type scars.[10,11] Most people observe significant improvement; however, those who experience the best outcomes are probably undergo scar subcision with other modalities such as laser resurfacing and peeling. Subcision stimulates new skin and collagen remodeling, while laser and peeling provide additional resurfacing benefits. Although needle subcision is a simple, valuable, and practical method, depression recurrence is a very common side effect, and overall achievement in this procedure is mild to moderate.[12] Acne scarring can be divided into three basic types: ice pick scars, rolling scars, and boxcar scars. Although rolling scars tend to be shallow, correction of the subdermal component is essential for treatment success.[13] Because of the common re-depression of acne scars in our patients in the first 2-3 weeks after needle subcision, we hypothesized that an alternative method such as cannula subcision might prevent re-depression by inducing more hemorrhage in the dermal layer, delaying the healing time, and stimulating the formation of more new connective tissue and collagen at the scar area.[14]

1.2 | Objectives

This study aimed to evaluate cannula subcision instead of needle subcision in the treatment of rolling acne scars.

2 | MATERIALS AND METHODS

2.1 | Trial design and population

This randomized controlled clinical trial was performed in 2016-2018 in Jordan Clinic, Tehran University of Medical Sciences, Tehran, Iran. In this study, 100 patients with rolling acne scars were recruited to be treated with either needle (27 gauge) or cannula (18 gauge) in two parallel groups. The number of sample size was obtained as 50 for each sample, with α (Cronbach's coefficient) > .9, which indicates a high level of construct validity of the questionnaire. Lesions were graded and classified by a board-certified dermatologist. Patients who had received any procedure for acne scar treatment, patients with history of coagulopathy, patients who were pregnant or lactating were excluded from the study.

2.2 | Intervention and treatment monitoring

All patients were subjected to 1% lidocaine with 1:100 000 epinephrine solution as a common local anesthetic. Lesions underwent needle or cannula subcision every 4 weeks for two sessions. Either the 27 gauge needle (for the needle subcision group) or the 18 gauge cannula (for the cannula subcision group) was inserted into the superficial dermis and passed through the subdermal plane parallel to the skin surface. Afterward, rapid repetitive back-and-forth motion of the needle under the scarred area was performed to disconnect scar and fibrous tissue sat the base, walls, borders, and shoulders of scars. Then, side-to-side needle motion known as fanning motion was also done to completely release the fibrous tissue. After the final step, ice compression was applied to the site of treatment for 20 minutes.

2.3 | Ethics and blinding

Informed consent was obtained from all the patients. Baseline demographic information of the patients was obtained and recorded in special questionnaires. Patients were blinded to the type of scar treatment (needle or cannula), and they were randomly allocated. The area to be subcised was outlined while the patients were sitting in a fixed and comfortable position.

2.4 | Statistical analyses

The outcomes of the subcision procedures were assessed by three board-certified dermatologists (blind) and by patients' satisfaction. After two sessions of treatment, the patients were asked to fill a questionnaire form, and the obtained results were analyzed by SPSS software ver.24.

3 | RESULTS

A total of 100 patients (50 patients each in the needle and cannula subcision groups) were entered in this study. All patients completed

FIGURE 1 The case was treated with cannula subcision. left picture relates to before and right picture shows 2 mo after cannula subcision

the study. The mean ages of the patients in the needle and cannula subcision groups were 21.03 ± 1.34 and 22.27 ± 3.79 years old, and the difference was not statistically significant ($P > .05$). Parameters such as pain, ease of technique, bruising, infection, convalescence, post inflammatory hyperpigmentation, scar formation, and patients satisfaction were evaluated in the questionnaire form, and all patients filled the form after the needle or cannula surgery. Before treatment, photographs per patients were taken, to expose acne scars well. Two (Figures 1 and 2), three (Figures 3 and 4) and six month (Figures 5 and 6) after the procedure, photographs taken in the same state were utilized to assess the final changes of the patients.

Physician satisfaction is shown in the Table 1. Patients satisfaction after the second session (Table 2), and the third- (Table 3) and sixth-month (Table 4) after treatment was evaluated. As shown in the tables, significant differences in satisfaction were observed between cannula subcision versus needle subcision surgery ($P < .05$). Infection was another parameter that was evaluated in this study. As demonstrated in Table 5, there was no significant difference between the cannula subcision and needle subcision groups

FIGURE 2 The case was treated with needle subcision. left picture relates to before and right picture displays 2 mo after needle subcision

FIGURE 3 The case was treated with cannula subcision. left picture relates to before and right picture displays 3 mo after needle subcision

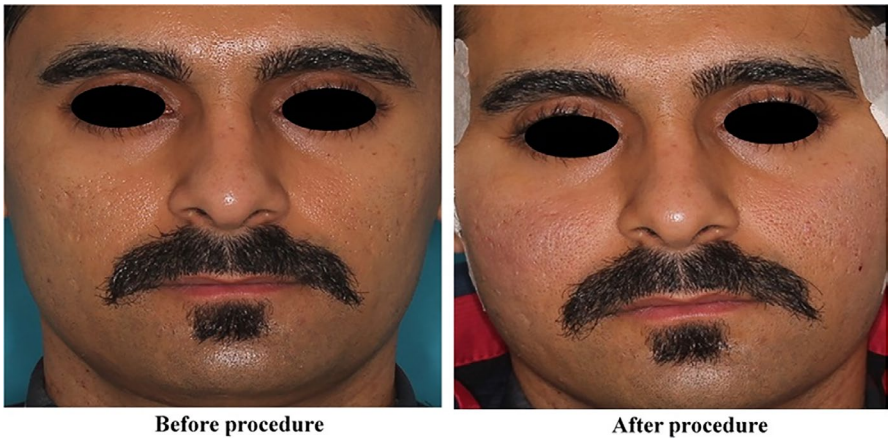

FIGURE 4 The case was treated with needle subcision. left picture relates to before and right picture displays 3 mo after needle subcision

FIGURE 5 The case was treated with cannula subcision. left picture relates to before and right picture displays 6 mo after needle subcision.

FIGURE 6 The case was treated with needle subcision. left picture relates to before and right picture displays 6 mo after needle subcision

TABLE 1 Satisfaction percentage documented from two physicians after the second, third, and sixth month

Physician satisfaction (%; Mean ± SD)		Subcision type		*P* value
		Cannula	Needle	
Physician 1	Second month	53 ± 8.2	45 ± 13.3	<.05
	Third month	61 ± 11.1	50 ± 11.4	
	Sixth month	80 ± 10.2	55 ± 6.1	
Physician 2	Second month	50 ± 6.2	41 ± 10.3	<.05
	Third month	63 ± 8.2	48 ± 9.3	
	Sixth month	83 ± 7.2	56 ± 8.1	

Note: Significant differences were observed between cannula subcision vs needle subcision ($P < .05$).

($P > .05$). This finding emphasizes that the type of needle does not play an important role in infection during surgery. Scar formation was also evaluated in the present study. A total of 9 (18%) patients treated with needle subcision suffered from scar formation during surgery ($P > .05$), whereas none of the patients treated with cannula subcision had scar during the study. Convalescence data showed that there was a significant difference in the reduction of convalescence between the cannula subcision group and the needle subcision group ($P < .05$). The ease of the technique also showed interesting differences between the cannula and needle subcision groups ($P < .05$). The ease of the technique and the high rate of success are encouraging aspects of cannula application in scar surgery (Table 6). Analysis of the side effects also demonstrated obvious differences between the cannula and needle subcision groups ($P < .05$). Based on these results, we emphasize that cannula subcision is safer than needle subcision (Table 7). The side effects of the technique such as bruising, swelling, PIH, and scar formation have significant differences between cannula subcision (Figure 1) vs needle subcision. (Figure 2; $P < .05$). Investigators' ratings after 3 months indicated that an average improvement rates in appearance in cases of needle subcision and cannula subcision were 39.3% and 85%, respectively.

4 | DISCUSSION

Several methods have been reported for the treatment of acne scars with variable results.[15-18] Orentreich was the pioneer of the subcision method and described it as a simple method for the treatment of several cutaneous deformities.[19,20] Subcision is a practical technique through which any area on the patient's face can be treated in a timely manner.[21] The treated scars can become significantly resurfaced, and rather persistent scars can be subcised over several

TABLE 2 Satisfaction percentage recorded from patients after the second session

Variable		Subcision type		
		Cannula	Needle	*P* value
Satisfaction after second month (%) (Mean ± SD)	Poor	14 ± 8.2	56 ± 13.3	<.05
	Moderate	42 ± 11.1	34 ± 11.4	
	Good	44 ± 10.2	10 ± 6.1	

Note: Significant differences in satisfaction were observed between cannula subcision versus needle subcision ($P < .05$).

TABLE 3 The percentages of patient's satisfaction after the third month.

Variable		Subcision type		
		Cannula	Needle	*P* value
Satisfaction after third month (%) (Mean ± SD)	Poor	12 ± 5.1	36 ± 12.4	<.05
	Moderate	36 ± 11.2	48 ± 13.4	
	Good	52 ± 13.2	16 ± 6.3	

Note: The satisfaction differences were significant between cannula subcision versus needle subcision ($P < .05$).

TABLE 4 The results of satisfaction percentage of patients after the sixth month

Variable		Subcision type		
		Cannula	Needle	*P* value
Satisfaction after sixth month (%) (Mean ± SD)	Poor	20 ± 7.3	42 ± 11.4	<.05
	Moderate	20 ± 5.2	44 ± 12.3	
	Good	83 ± 11.2	14 ± 6.8	

Note: As the results show significant differences were observed in satisfaction between cannula subcision and needle subcision ($P < .05$).

TABLE 5 Complications after surgery

Variable		Subcision type		
		Cannula	Needle	*P* value
Infection (%) (Mean ± SD)	Yes	0	4 ± 1.0	>.05
	No	100 ± 6.2	96 ± 13.6	
Scar formation (%) (Mean ± SD)	Yes	0	18 ± 11.1	<.05
	No	100 ± 10.3	82 ± 10.2	
Convalescence (%) (Mean ± SD)	No need	62 ± 8.0	50 ± 7.2	<.05
	<2 wk	2 ± 1	34 ± 5.0	

Note: No significant difference was observed in infection between cannula subcision and needle subcision ($P > .05$).

TABLE 6 The ease of technique

Variable		Subcision type		
		Cannula	Needle	*P* value
The ease of technique (%) (Mean ± SD)	Poor	2 ± 0.8	30 ± 11.1	<.05
	Moderate	6 ± 2.1	60 ± 13.6	
	Good	92 ± 12.8	10 ± 4.3	

Note: Significant difference in the ease of technique was observed between cannula subcision versus needle subcision ($P < .05$).

TABLE 7 The side effects of the technique such as bruising, swelling, PIH, and scar formation

Variable		Subcision type		
		Cannula	Needle	*P* value
Side effect (%) (Mean ± SD)	Poor	2 ± 1	66 ± 14.4	<.05
	Moderate	8 ± 1.2	32 ± 12.6	
	Good	45 ± 13.2	2 ± 1	

sessions to be further smoothened or combined by laser resurfacing.[22] Treating the depressed scars can be accomplished by two mechanisms. First, releasing the attachments of the fibrous tissues and breaking up the tethers attaching the scars, and second, stimulating the formation of new connective tissue after hemorrhage under the surgery point and its subsequent remodeling. The accumulation of blood and the subsequent revision lead to long-term elevation of the defect, although this does not usually reach the final marked improvement following the first treatment.[20] Only a few studies have assessed the efficacy and safety of subcision in the treatment of depressed acne scars. Alam et al reported the efficacy of subcision in 40 patients with rolling acne scars and showed that both physicians and patients observed that subcision could remodel rolling acne scars. They estimated observed improvement at just over 50% and 90% of patients reported improvement in their appearance side effects were negligible our study was shown similar results in complications.[10] Balighi et al reported a study on the efficacy of Nokor subcision in the treatment of rolling acne scars in 20 patients where they investigated a novel subdermal filler "absorbable plain catgut suture" combined with subcision. The mean self-assessment of patients' improvement in their study was >50% and the response rate was not significantly different with implant.[21] In our study, results showed that cannula subcision of rolling scars could markedly increase the efficacy of subcision and result in significant and persistent improvement in short time and a degree of satisfaction, without considerable complications and side effects, in comparison with needle subcision.[23] AbdollahKandil evaluate the clinical efficacy and safety of subcision-suction method in treatment of atrophic scar in thirty five patient and showed excellent clinical improvement in 56.5% of them.[24] HayderR.Al-hammamy evaluate the result of subcision with 18 gauge needle in 16 patient and showed that this method appears to be simple, safe, minimally invasive, well-tolerated and effective surgical procedure that provides significant long-term betterment for depressed acne scar especially.[13] According to the experiences of dermatologists with needle subcision, the recurrence of depression is a very common side effect, particularly in the first 2-3 weeks after needle subcision, which cannot

be prevented even with repeated sessions of needle subcision. In our previous pilot study by Nilforoushzadeh et al, subcision using the cannula showed good and very good improvement in about 88% of patients with a satisfaction of good and very good improvement in all the patients (100%). The average number of lesions before the treatment was 24.8 ± 12.1, which was reduced to 12.8 ± 2.1 after treatment.[23]

In this study, we compared cannula subcision with needle subcision, and both the investigators and patients found that cannula subcision resulted in greater improvement and fewer side effects when compared to those with needle subcision. The rates of degree of satisfaction, scar formation, convalescence, the ease of the technique, and side effects were completely different between the two groups, but the rate of infection was almost similar. Subcision using the cannula showed good and very good improvement in about 83% of patients based on our questionnaire form.

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