

## Evaluation of Subcision-Suction Method in the Treatment of Depressed Scars

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### ABSTRACT

**Background:** Treatment of depressed scars is a therapeutic challenge that may require multiple modalities; Subcision is a technique that has been reported to be safe, simple, and of value in treating atrophic scars. Subcision releases scar surfaces from underlying attachments and induces connective tissue formation beneath the scar directly, without injury to the skin surface. Therefore, subcision is a valuable method, but it was reported that its most common complication is, high recurrence rate, especially in the first 2 to 3 weeks following the procedure.

**Objective:** To evaluate the clinical efficacy and safety of subcision-suction method in the treatment of atrophic scars.

**Patients and Methods:** This study was carried out on 62 patients with cutaneous facial depressed scars of various types, the depressed scars were treated by superficial dermal undermining, with mainly an 18-gauge 1.5 inch Nokor admix needles followed by suctioning. The protocol for suctioning was: Start of suction on the third day after subcision and its continuation at least every other day for 2 weeks. Follow-up was made for 6 months following completion of treatment course to detect efficacy, Complications and recurrence.

**Results:** Thirty five patients (56.5%) showed excellent clinical improvement, nineteen patients (30.6%) showed very good clinical improvement, six patients (9.7%) showed good clinical improvement and two patients (3.2%) showed poor clinical improvement. All patients showed mild erythema and edema of the subcised areas, diminished generally within 2-5 days. Bruising was observed in about 100% of all patients and It was gradually absorbed within 3-10 days.

**Conclusions:** Frequent suctioning at the recurrence period of subcision increases subcision efficacy remarkably and causes significant and persistent improvement in short time, without considerable complication, in depressed scars of the face.

**Key Words:** Subcision – Suction – Depressed scars.

### INTRODUCTION

Cutaneous scarring is defined as a macroscopic disturbance of the normal structure and function of the skin architecture, with an alteration of skin texture, color, vascularity, nerve supply and biomechanical properties [1].

Atrophic scars are dermal depressions that result from an acute inflammatory process affecting the skin, such as after cystic acne or varicella. Surgery or other forms of skin trauma may also result in atrophic scars. The inflammation associated with these conditions leads to collagen destruction with dermal atrophy. Atrophic scars are initially erythematous and become increasingly hypopigmented and fibrotic over time [2], acne scars are one of the most common causes of facial scarring, they occur because of impaired resolution or healing of damage caused in and around pilosebaceous follicles during active inflammation. The enzymatic activity and inflammatory mediators released from acne follicles also may destroy the deeper structures and contribute to the production of atrophic scars [3].

Atrophic scars create not only cosmetic problems, but also psychological effects such as embarrassment, poor self-esteem and social isolation. Because of these physical and psychological effects, remain ongoing needs for medical resources to resolve scarring [4].

The objective of scar treatment is to give the skin a more acceptable physical appearance. Management approaches include: Resurfacing techniques as: (Chemical peeling, dermabrasion, laser abrasion, and selective photothermolysis); use of dermal fillers, and surgical techniques that include: excision, punch elevation, and subcision [5].

Subcision (subcutaneous incision) is a surgical intervention used to treat a variety of skin depressions including atrophic acne scars and other types of depressed scars for years [6].

In subcision, mechanisms of scar improvement are due to releasing fibrotic strands underlying scars, organization of blood in the induced dermal

pocket and connective tissue formation in the area [7].

Although subcision is safe, valuable and practical, depression recurrence is a very common side-effect, especially in the first 2-3 weeks following subcision [8].

Considering the fact that successful treatment of acne scars is challenging and difficult, [19-22] multiple modalities are often required in combination to provide optimal correction [9].

Therefore, in this study we used repeated suctioning on the subcised scars at the recurrence period as a complementary treatment and evaluate the clinical efficacy and safety of subcision-suction method in the treatment of atrophic scars.

## PATIENTS AND METHODS

The present study was carried out on sixty two patients, of both sexes and of skin types ranged from II-IV, suffering from mild-to-severe acne scars, chicken atrophic scars and traumatic depressed scars along more than one year. All patients were selected from the outpatient clinic of Dermatology and Venereology Department of Zagazig university hospitals. Patients were enrolled in our study after being asked about different scar treatments, informed by verbal and written explanations about our treatment method, and filling out a consent form.

### *Inclusion criteria:*

Patients with depressed scars either acne scars, post chicken or post traumatic depressed scars, Patients age of 16 years old and more older.

### *Exclusion criteria:*

Patients with active cystic acne, patients take isotretinoin therapy in the previous 6 months, patients with keloid formation tendency, patients suffering from coagulation or bleeding disorders, patients taking drugs that prolong bleeding as aspirin.

### *Methods:*

*Complete history taking including:* History of trauma or surgery causing the atrophic scars, history of acne (duration and treatment), history of systemic diseases like diabetes, hepatic, cardiac or renal diseases, dermatological examination, routine laboratory investigations were done including: Complete blood picture, bleeding and coagulation time, blood sugar level, to exclude systemic diseases that may prolong bleeding time after our procedure.

Evaluation of the depressed scar; before and after treatment by 2-6 months by Stoner Brooks scar evaluation [10].

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### Stoner Brooks scar evaluation

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- (i) Width of the scar: >2 mm - ≤2mm (0-1 points);
- (ii) Height: Elevated - depressed (0-1 points);
- (iii) Color: Darker - same or lighter (0-1 points);
- (iv) Hatch or suture marks: Present - absent (0-1 points);
- (v) Overall appearance: Poor - good (0-1 points) / total score from 0 to 5 points.

- Applicable for all scars.
  - Assessing hatch and suture marks.
  - An increasing score correlates with an improving scar.
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Photographs were taken in standard fashion before subcision, immediately and 5 days after subcision; also after the end of treatment course, 2 and 6 months after subcision.

### *Subcision-suction method:*

*Disinfection:* The operation area was prepared using Povidon Iodine.

*Anesthesia:* We used Lidocaine injection subcutaneously and the scar margins were marked previously to prevent the scar fading after injection.

*Patients' position:* During the operation, the patients had sitting or semi-sitting position in which the scars were more obvious compared with supine position.

*Type of the needle:* We used 18 gauge 1.5 inch, Nokor needles, attached to 3cc syringes to make it easier to grasp.

### *Subcision:*

We applied subcision for various types of depressed scars, to facilitate the release of fibrotic tissue, the scar area was pinched or stretched to flatten the whole scar surfaces and the skin became tight and stable. The needle was inserted 1-2mm from the target scar with the beveled tip upwards and nearly parallel to the skin surface into the superficial dermis. First lancing motion (linear inserting-withdrawing needle motion) was performed sufficiently to release scar sub-surfaces including walls, base, borders or shoulders and 1mm of the margin; in superficial dermis and finally fanning motion (side-to-side needle motion) was used to complete cutting of fibrous tissue in one plane (superficial dermal undermining).

Sweeping the needle side-to-side under the scar without resistance and visible lifting up of the scar surface was the end-point of the procedure. In some scars, especially large ones, 2-3 entry sites were needed to complete undermining of scars.

Homeostasis was achieved by just putting a piece of gauze, with ice, without pressure. Then a simple thin dressing was placed on the area and removed within 24 hours, Antibiotic cream was applied and oral antibiotic was also prescribed.

#### *Suction:*

Considering the recurrence period of subcised scars, our protocol for suctioning was: Starting suction sessions on the 3<sup>rd</sup>-5<sup>th</sup> day after subcision and continuing at least every other day for 2 weeks. We explained to the patients about maximum scar re-depression from the 3<sup>rd</sup> to 10<sup>th</sup> day after subcision and the potential effect of having more frequent suctioning sessions within this period on the outcome. Therefore, based on their possibility to come to the clinic, the patients could have different suctioning sessions in these two weeks following subcision.

Suctioning was performed with a handpiece of microdermabrasion device without crystal abrasion, with a 5mm disposable nozzle, on the subcised scars, which had the same level as the skin or depressed. Suctioning was performed by both vertical and horizontal motions.

In the beginning of suction, elevated lesions were not suctioned until they became flat. On the first days, we used less negative pressure; but in the subsequent sessions, depending on the condition of scars, we could increase negative pressure, length of time (not more than 4 second in each pass) and the number of suctioning passes (even 8-12 passes) per session. 'Effective suctioning caused oedema and haemorrhages in the subcised scars and led to elevation of depressing scars above the skin surface'.

#### *Improvement criteria:*

Any measurable decrease in size and depth was considered to be a sign of improvement, two dermatologists were asked to record percentage of improvement for each patient after completion of treatment by comparing before-and-after digital photographs of the face. Finally, the minimum rate on which both investigators agreed was considered as investigators' view in the study, at the final visit, patients were asked to assess the overall response and their satisfaction of the results as a percentage.

#### *Assessment of efficacy of the therapeutic procedure:*

#### *Clinical assessment:*

The degree of improvement was estimated based on the mean value of the patient and two

physicians opinions (regarding shape, depth, and width of the scars) and percentage of scar improvement was evaluated according Stoner Brooks Scar Evaluation as follows:

- *Mild improvement:* If there was <25% improvement in the scar.
- *Good improvement:* If there was 25-49% improvement in the scar.
- *Very good improvement:* If there was 50-74% improvement in the scar.
- *Excellent improvement:* If there was ≥75% improvement in the scar.

*Safety assessment:* To detect any complications occurred for the patients as erythema, edema, itching, ecchymosis, infection, overcorrection, or any allergic manifestations, etc...

*Follow-up assessment:* To detect any improvement or worsening of the scar over a period of six months.

## RESULTS

#### *Clinical assessment:*

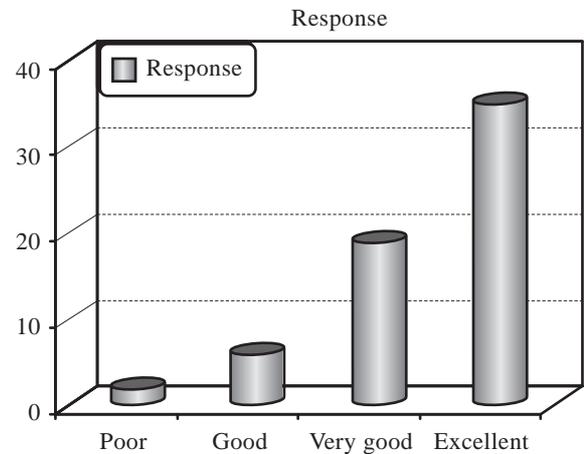
Thirty five patients (56.5%) showed excellent clinical improvement, nineteen patients (30.6%) showed very good clinical improvement, six patients (9.7%) showed good clinical improvement and two patients (3.2%) showed poor clinical improvement.

Table (1): Demographic and clinical data of the patients.

		No. of patients	Percent
Age	<20	24	38.7
	20-29	21	33.9
	30-39	16	25.8
	≥40	1	1.6
Sex	Male	53	85.5
	Female	9	14.5
Skin phototype	II	26	41.9
	III	27	43.5
	IV	9	14.5
Number of suction sessions	10-6	43	68.2
	5-3	19	31.8
Duration of the scar	≤2y.	30	48.4
	2-5y.	26	41.9
	>5y.	6	9.7
Cause of the scar	Acne	20	32.1
	Chicken pox	6	10.3
	Traumatic	36	57.4
Type of the scar	Linear	20	32.4
	Ice pick	29	46.3
	Rolling and boxcare	13	21.3
	Total	62	100.0

Table (2): Evaluation of scar according to (Stoner Brooks Scar Evaluation) before, after treatment and percentage of the clinical response in all patients.

		No. of patients	Percent
Grade before treatment	0.00	15	24.2
	1.00	40	64.5
	2.00	7	11.3
Grade after treatment	1.00	4	6.5
	2.00	1	1.6
	3.00	2	3.2
	4.00	14	22.6
	5.00	41	66.1
Response (1)	Poor	2	3.2
	Good	6	9.7
	Very Good	19	30.6
	Excellent	35	56.5
	Total	62	100.0



Graph (1): Evaluation of the atrophic scars according to (Stoner Brooks Scar Evaluation) before and after treatment and percentage of the clinical successes in all patients.

Table (3): Relation between the cause of the atrophic scars and the degree of clinical improvement.

			Cause of the scar			Total	X <sup>2</sup>	p
			Acne	Chichen	Traumatic			
Clinical improvement (1)	Poor	No. of the patients % within the cause	2 10.0%	0 0.0%	0 0.0%	2 3.2%	7.7	0.25
	Good	No. % within the cause	0 0.0%	1 16.7%	5 13.9%	6 9.7%		
	Very good	No. % within the cause	7 35.0%	1 16.7%	11 30.6%	19 30.6%		
	Excellent	No. % within the cause	11 55.0%	4 66.7%	20 55.6%	35 56.5%		
Total		No. % within the cause	20 100.0%	6 100.0%	36 100.0%	62 100.0%		NS

No significant difference but excellent response more with chichen pox scarring.

Table (4): Relation between shape of the scar and degree of clinical improvement.

			Type			Total	X <sup>2</sup>	p
			Linear	Ice pick	Rolling and boxcare			
Clinical improvement (1)	Poor	No. of the patients % within the type	0 0.0%	1 3.4%	1 7.7%	2 3.2%	7.9	0.2
	Good	No. % within the type	4 20.0%	2 6.9%	0 0.0%	6 9.7%		
	Very good	No. % within the type	4 20.0%	12 41.4%	3 23.1%	19 30.6%		
	Excellent	No. % within the type	12 60.0%	14 48.3%	9 69.2%	35 56.5%		
Total		No. % within the type	20 100.0%	29 100.0%	13 100.0%	62 100.0%		NS

No significant difference but excellent response more with Rolling and boxcare scarring.

Table (5): Relation between duration of the atrophic scars and degree of clinical improvement.

		Scar duration			Total	X <sup>2</sup>	p
		≤2 y.	2-5 y.	>5 y.			
Clinical improvement (1)	Poor	No. of the patients % within scar duration	2 6.7%	0 0.0%	0 0.0%	2 3.2%	5.5 0.4
	Good	No. % within scar duration	1 3.3%	4 15.4%	1 16.7%	6 9.7%	
	Very good	No. % within scar duration	11 36.7%	7 26.9%	1 16.7%	19 30.6%	
	Excellent	No. % within scar duration	16 53.3%	15 57.7%	4 66.7%	35 56.5%	
Total		No. % within scar duration	30 100.0%	26 100.0%	6 100.0%	62 100.0%	

No significant difference but improvement more with duration >5 years.

Table (6): Relation between the age of the patient and degree of clinical improvement.

		Age				Total	X <sup>2</sup>	p
		<2 y.	20-29	30-39	≥40			
Clinical improvement (1)	Poor	No. of the patients % within age	0 0.0%	1 4.8%	1 6.2%	0 0.0%	2 3.2%	10.5 0.3 NS
	Good	No. % within age	3 12.5%	2 9.5%	1 6.2%	0 0.0%	6 9.7%	
	Very good	No. % within age	9 37.5%	2 9.5%	8 50.0%	0 0.0%	19 30.6%	
	Excellent	No. % within age	12 50.0%	16 76.2%	6 37.5%	1 100.0%	35 56.5%	
Total		No. % within age	24 100.0%	21 100.0%	16 100.0%	1 100.0%	62 100.0%	

No significant diff. but more improvement in the ages between (20 – 29) years.

Table (7): Relation between sex of the patient and degree of clinical improvement.

		Sex		Total	X <sup>2</sup>	p
		Male	Female			
Clinical improvement (1)	Poor	No. of the patients % within sex	2 3.8%	0 0.0%	2 3.2%	1.2 0.7 NS
	Good	No. % within sex	5 9.4%	1 11.1%	6 9.7%	
	Very good	No. % within sex	15 28.3%	4 44.4%	19 30.6%	
	Excellent	No. % within sex	31 58.5%	4 44.4%	35 56.5%	
Total		No. % within sex	53 100.0%	9 100.0%	62 100.0%	

No significant but improvement more in female.

Table (8): Relation between no. of suction sessions and degree of clinical improvement.

			No. of suction sessions		Total	X <sup>2</sup>	p
			10-6 s.	5-3 s.			
Clinical improvement (1)	Poor	No. of the patients %	2 4.7%	0 0.0%	2 3.2%	10.4	0.01* S
	Good	No. %	4 9.3%	6 31.6%	10 16.1%		
	Very good	No. %	25 58.1%	13 68.4%	38 61.3%		
	Excellent	No. %	12 27.9%	0 0.0%	12 19.4%		
	Total	No. %	43 100.0%	19 100.0%	62 100.0%		

There was significant difference between patients who maintain and take 10-6 sessions and who not maintain and take 5-3 sessions.

#### Safety assessment:

All patients showed mild erythema and edema of the subcised areas, diminished generally within 2-5 days.

Bruising was observed in about 100% of all patients and It was gradually absorbed within 3-10 days.

*Prominent features after suctioning were:* Increased haemorrhage (in the first week), oedema and elevation of scars which were depressed before

suctioning. Hyperpigmentation were noticed among 4 patients (6.5%) from our patients.

#### Follow-up assessment:

There was somewhat recurrence after 6 months, observed in 3 patients (4.8%), who didn't follow our suctioning protocol regularly.

All other patients (95.2%) showed gradual improvement with time to give the best results at the end of follow-up period (after six months) and no recurrence occurred.



Fig. (1-A): Female patient aged 30 years old with acne scars on her right cheek before treatment.



Fig. (1-B): Same patient after six months of treatment with good improvement and no recurrence.



Fig. (2-A): Male patient aged 19 years old with post traumatic scar on his forehead before treatment.



Fig. (2-B): Same patient after six months of treatment with excellent improvement and no recurrence.

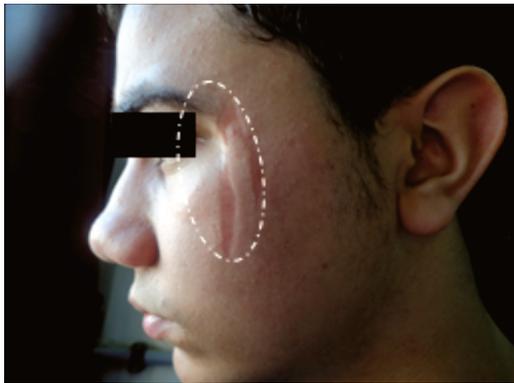


Fig. (3-A): Male patient aged 16 years old with post traumatic scar on his left cheek before treatment.



Fig. (3-B): Same patient after six months of treatment with very good improvement and no recurrence.



Fig. (4-A): Female patient aged 28 years old with post chicken pox scars on her forehead before treatment.



Fig. (4-B): Same patient after six months of treatment with good improvement.

## DISCUSSION

Subcision is a simple, well-tolerated surgical procedure with no remarkable side-effects and applicable in any area of the face it is a surgical intervention used to treat a variety of skin depressions including atrophic acne scars and other depressed scars for years. In subcision, the mechanisms of scar improvement are: Releasing fibrotic strands underlying scars, organization of blood in the induced dermal pocket and connective tissue formation [11].

When subcision was first introduced, it was performed using a tri-beveled hypodermic needle. Since then, other instruments that have been used are sharp hypodermic needles, usually 19 to 21g. To match the size of the scar. The 18G., 1.5 inch Nokor admix needle (Becton Dickinson and Co., Franklin Lakes, NJ) has a triangular tip and is one of the most commonly used subcision instrument [11].

Although subcision is safe, valuable and practical, depression recurrence is a very common side-effect. Aalami et al., [8] observed such common

re-depression in their patients in the first 2-3 weeks after subcision as follows: start of re-depression from 2 to 5 days after subcision, rapid progress of re-depression up to about the 10<sup>th</sup> day of subcision and gradual progression for about 1 week more. This is concurrent with absorption of oedema and haemorrhage in dermal pocket and completion of healing process of dermal wound.

Therefore, considering the possibility of doing suction by microdermabrasion device, Aalami et al., [8] found that repeated suctioning of the subcised scars at the recurrence period definitely prevent re-depression by induction of repeated haemorrhage in dermal pocket, delay in healing and more new connective tissue formation at the scar area.

In our study, 62 patients with cutaneous facial atrophic scars (32.1% atrophic acne scars, 10.3% chicken pox atrophic scars and 57.4% traumatic scars) were treated with subcision-suction method then the efficacy and safety of this combination were evaluated.

They were 53 males (85.5%) and 9 females (14.5%) with facial atrophic scars. There was

significant increase in the number of males compared with females; this may be explained by high frequency of males' exposure to trauma than females. Also, most of females were afraid about the technique i.e. the syringe used in subcision.

We found that the good results of our study (56.5% of patients have excellent response and 30.6% have very good response) may be related to the type of the needle; we used which is an 18-gauge 1 1/2 inch (Nokor needle) which parallel to Jacob et al. [9], who found that better results could be achieved by using Nokor needle. Because, it's sharp and triangular tip allows smooth and thorough separation of the fibrous cords. Also it was reported that Nokor needle is known as the typical instrument for subcision.

In our study, we performed superficial dermal undermining under the whole scar surfaces including base, walls, borders, shoulders and 1mm of the margins, According to Aalami et al. [8], who stated that superficial dermal undermining was the key point of successful undermining for various types of atrophic and depressed scars in their patients, and by using this method most of atrophic scars of a patient in any type, number, shape and size could be treated in one session. Also they said that, deeper undermining was not as effective as superficial dermal undermining in management of various types of atrophic scars.

We observed a decrease in the size and depth of subcised scars over time, results after 2 months were better than after 2 weeks from the procedure and results after 6 months were better than after 2 months from procedure date. This was in agreement with Vaishnani, [12], who stated that results after subcision differ at 2 months and 6 months, with greater improvement observed over time, because scar remodeling is a continuous process, and it cannot be considered to be in a steady state until at least 2 years after wounding.

In our study, the average improvement in patients with limited suction sessions ( $\leq 5$  suction sessions) was (32 %  $\pm$  17%), which is nearly similar to the results of subcision alone, Vaishnani, [12], who did a study about the efficacy of subcision in depressed scars and stated that improvement in his patients was about 30%.

The good results also in our patients who take more suction sessions especially in the first week; showed marked improvement than those who didn't follow our suctioning protocol regularly and had few suction sessions. This was in agreement with the results of Aalami et al. [8], who did this com-

ination therapy on 58 patients with atrophic scars and reported that improvement in subcision-suction method compared with subcision alone was quite remarkable and showed that repeated suctioning at the recurrence period increases the efficacy of subcision.

Also the good results in our study may be due to, starting suction sessions on the third-fifth day after subcision and continued every day or every other day for 2 weeks, this was in agreement with Aalami et al. [8], who stated that maximum scar re-depression occurs from the 3<sup>rd</sup> to 10<sup>th</sup> day after subcision. Moreover, they stated that the best time to start suctioning is the third-fifth day after subcision; and the most important time for doing suction to prevent scar recurrence is the first week of suction period. They named this period (the Golden Time). Daily suctioning in this time increases the patient's chance to have "80% improvement and more". In addition, the second week of suction period has the maintenance role and stabilizes the results (Maintenance Time).

Atrophy and fibrous tissue formation following wound healing or improvement of acne is the cause of depression that occur in post-traumatic or in acne scars. In subcision, due to release of fibrotic tissue, scar surfaces separate from underlying attachment and blood dermal pocket is formed beneath the scar. Blood not only acts as a short-term spacer to keep the tissue from early attachment, but also the subsequent organization of blood is thought to induce connective tissue formation and correction of the defect, because the blood clot is made up of cross-linked fibrin, fibronectin, and platelets that trap plasma proteins and blood cells. Also, endogenous growth factors including EGF, FGF, PDGF and TGF- $\beta$  family are initially derived from the performed clot [13] and the role of these growth factors in healing; induce angiogenesis, proliferative activity of fibroblasts, enhancing synthesis of proteins, vasculogenesis, expression of genes that induce DNA synthesis, cell proliferation, and promotes cell differentiation and re-epithelialization. So, helps for new connective tissue formation beneath the subcised scars [14].

We used these points by repeated suctioning as a complementary treatment, which causes repeated haemorrhage, delay in early attachment of dermal wound and more new connective tissue formation during the healing process of the subcised scar. In other words, this method is based on elimination of the cause of depression and bound-down appearance of scars and causes scar elevation by patient's own connective tissue.

Regarding age of patients and degree of clinical improvement in this study, the least improvement was noticed in patients with ages more than 40 years, their mean improvement was ( $53.5\% \pm 27.25\%$ ), while mean improvement in patients aged 20-29 years was ( $83.13\% \pm 5.94\%$ ). This can be explained by that the elderly patients show specific disruptions in the wound-healing cascade, such as elevated levels of proteases, altered ratios of growth factors and their receptors with a reduced inflammatory response and a slower rate of healing [15].

As regards sex of patients and degree of clinical improvement, for both groups there was more clinical improvement in female patients as compared to male patients. This finding can be explained by Calvin [16], who stated that estrogen receptors have been demonstrated in the nucleus and/or the cytoplasm of various cells in human skin and in cells such as macrophages, fibroblasts, and endothelial cells. All of which play vital roles in the healing process, suggesting a direct effect of oestrogens on both intact and wounded skin. Also, Ashcroft et al. [17], noticed that in post-menopausal women, there is increased inflammation, dysregulated protease activity and reduced matrix deposition leads to delayed wound healing. Exogenous estrogen ( $17\beta$ -estradiol) reverses this healing delay, reduce inflammation and stimulate re-epithelialization. Moreover, Berard et al. [18], stated that; estrogens, in the form of hormone replacement therapy (HRT), protect against the development of chronic wounds.

Regarding the cause of atrophic scars and degree of clinical improvement, there were better results within traumatic patients with mean improvement of ( $73.60\% \pm 9.32\%$ ) as compared to patients with post acne with mean improvement of ( $51.35\% \pm 22.53\%$ ); this can be explained as follow: It was reported that acne lesions are unusual in that the inflammation is initiated beneath the epidermis in the infrainfundibular region of the pilosebaceous structure, thus the subsequent scarring often involves deeper structures rather than just the surface. Also the enzymatic activity and inflammatory mediators destroy the deeper structures and this loss of structure adds to the production of atrophic scarring. Moreover, Facial fat is destroyed by the inflammatory mediators that at work in the deep cystic activity of acne lesions. Also, Colwell et al. [19], stated that; there is more inflammatory response (regarding severity and duration) in inflammatory skin disorders as compared to traumatic wounds during wound healing, making the scars formed more aggressive to treatment.

Regarding shape of the atrophic scars and the degree of clinical improvement; there was more improvement in patients with box care & rolling scars with mean improvement ( $70\% \pm 17\%$ ) Followed by patients with linear scars with mean improvement of ( $56\% \pm 27\%$ ) And the least improvement was for the ice pick type with mean improvement of ( $27\% \pm 10\%$ ), It was reported that in ice pick scars there is affection of the deeper dermis in a punctate fashion, producing these sharp walled or ice pick scars and these scars are very distressing to the patient and are probably the most resistant to many corrective techniques [13].

In our study, there was no significance between different scar duration and degree of clinical improvement, it was reported that scars continue to remodel for a long time after wounding, and cannot become in a steady-state condition until at least 2 years post-wounding, in this stage the collagenous matrix becomes organized into thicker, more heavily cross-linked bundles. Also it was noted that with time post wounding, collagen turnover is increased and more fibrous tissue is formed. But, with subcision procedure, no matter the amount of fibrous tissue present, as the mechanism of subcision is to free the surface of the depressed scars from underlying fibrous attachments.

In this study we Found that in some cases with more severe (deep) scars but had almost daily suction sessions in the two weeks period following subcision, they got a great benefit and show better results than those with same grade of scars but had a fewer suction sessions. As mentioned before repeated suctioning as a complementary treatment, causes repeated haemorrhage, delay in early attachment of dermal wound and more new connective tissue formation during the healing process of the subcised scar [20].

Regarding safety assessment of this therapeutic technique in the present study, complications were few, as swelling and bruising following the procedure were the most common complaint of our patients, which diminished within 3-10 days. From one month after subcision to six months (the follow-up period), no complication were found in our patients. This was in agreement with Balighi et al. (2008) [21], who mentioned that the complication between their cases were few, only swelling and bruising following subcision in 60% of their patients. Also it was reported by many authors that, Subcision is a safe, easy to perform, well-tolerated, and effective surgical technique for treating atrophic scar [8].

On the other hand, Aalami et al. [8], mentioned that during 4<sup>th</sup> to 8<sup>th</sup> day after subcision, haemorrhagic papule and pustule can be formed followed by formation of hypertrophic scar, they stated that performing subcision too superficial (sub epidermal like undermining) was the main aetiology for this complication in some of their cases, they explained the mechanism by which this technical error causes a hypertrophic scar is formation of a prominent subepidermal blood pocket, which consequently induces an elevated fibrous scar tissue immediately under the epidermis, also skin susceptibility can play a role in the aetiology for hypertrophic scar following subcision. So, taking a detailed and careful history from the patients was very important.

In this study we took care of many important precautions regarding subcision procedure to avoid a lot of complications such as: Sufficient anesthesia, selection of the needle, Placement of the needle was meticulously planned, always in the superficial dermis, prescribing local and systemic antibiotic following subcision.

Considering the points discussed, we introduce subcision-suction method as a highly effective method for treatment of cutaneous atrophic scars (including post traumatic atrophic scars, post chicken and various types of acne scars, except icepick type). It seems that this method has the potential to be used as the first step for atrophic scars management.

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