

ORIGINAL ARTICLE

Subcision in acne scar with and without subdermal implant: a clinical trial

K Balighi,† RM Robati,‡* H Moslehi,† AM Robati†

† Department of Dermatology, Razi Hospital, University of Tehran/Medical Sciences, Tehran, Iran

‡ Skin Research Center, Shahid Beheshti University, M.C. Tehran, Iran

Keywords

acne, scar, subcision

*Corresponding author, Skin Research Center, Shahid Beheshti University, M.C. Shohada-e Tajrish Hospital, Shahr-dari St, 1989934148, Tehran, Iran, tel. +98 21 44309454; fax +98 21 22744393; E-mail: rmrobati@gmail.com

Received: 24 October 2007,
accepted 20 November 2007

DOI: 10.1111/j.1468-3083.2008.02583.x

Abstract

Background Subcision is a procedure that has been reported to be beneficial in treatment of acne scars.

Objective This study aims to assess the efficacy of subcision in the treatment of rolling acne scars and evaluate a novel subdermal filler 'absorbable plain catgut suture' with subcision.

Methods Twenty-two patients with rolling acne scars underwent subcision, 20 of whom completed treatment and follow-up period. One side of the face underwent subcision and another side subcision with subdermal implant. The patients and investigators' assessment of improvement were both recorded.

Results Subcision showed mild improvement in about 60% of patient and moderate improvement in about 40% of them. The rate of response showed no significant difference with the use of subdermal implant. The side-effects of local oedema, bruising and infection were all transient.

Conclusions Subcision seems to be a safe method to correct the rolling acne scars with long-term improvement. However, the subdermal implant led to no significant superior results.

Introduction

Acne is a common condition with considerable prevalence worldwide. In some patients, the inflammatory response results in permanent, disfiguring scars. These scars may cause significant psychosocial stress and lead to anger and depression.¹ Numerous descriptive terms have been used to diagnose the types of scarring in those persons with acne. In one of the most practical classifications, these scars divided into three categories: icepick, rolling and boxcar scars. Different treatment modalities have been proposed for each group of scars.

Rolling scars result as dermal adhesion of otherwise normal skin and are usually wider than 4 to 5 mm. Due to subdermal component, releasing of these adhesions is essential for treatment. Icepick scars are narrow deep, sharply defined tracts that extend vertically to deep dermis or subcutis. Boxcar scars are round to oval depressions with sharply defined vertical edges similar to varicella scars.²

There are many different modalities to treat acne scars including surgery, lasers, dermabrasions and different dermal fillers.³⁻⁵

In 1995, Orentreich defined Subcision® as a method of subcuticular underming for the treatment of depressed cutaneous scars and wrinkles with use of a tri-beveled hypodermic needle. The depression is lifted by the releasing action of the procedure as well as from connective tissue that forms in the course of normal wound healing. This technique is useful in treating a variety of cutaneous depressions, including scars and wrinkles.⁶ This method would be the treatment of choice for the rolling type of post acne scarring.² There are limited studies assessing its efficacy in the treatment of acne scar, striae, cellulite and even axillary osmohydrosis.⁷⁻¹⁰

Therapeutic methods with considerable efficacy or acceptable side-effects and simple post-operative care would be desirable for patients and led to more compliance with treatment. Subcision seems to be a favourable choice in this regard due to its simple method and low requirement for post-operative care.

The use of filler substance such as Fibrel in conjunction with subcision may improve the outcome in regard of induction a tissue reaction under scar area, but the results of previous studies show that the use of fillers with subcision adds no significant benefit to the efficacy of subcision. However, each of these methods would be valuable in the scar correction.^{2,11}

Implantation of foreign materials, including surgical sutures, causes cellular response. Use of materials of natural origin is connected with a more pronounced reaction than that caused by synthetic sutures.¹² In a study, Gabreilli *et al.* suggested that it would be patient characteristic such as age and gender or wound feature (i.e. length and site) determine local wound complication rather than suture material.¹³ Thus, absorbable suture materials seem to add few adverse effects and could be used safely.

In this regard, we use plain catgut suture size 0 as a subdermal implant under subcision site to assess whether it would enhance the efficacy of subcision due to the induced tissue reaction and its safe profile.

The aim of our study was the assessment of subcision in rolling acne scars and evaluation the use of a novel dermal short-lived filler 'absorbable plain catgut suture' in conjunction with subcision.

Patients and method

This study was designed and conducted as an open-labelled clinical trial. All patients suffering from rolling acne scars on their face with a symmetrical distribution of lesions and age older than 18 were included in the study. Age less than 18 years old, breast feeding, pregnancy, history of coagulopathy, active infection on the face, recent intake of isotretinoin (in the past 12 months) and inability to come for follow-up all were our exclusion criteria. All the patients were instructed about the study, and they signed the informed consent forms. This study was approved by the ethics committee of our university. The study was performed according to the Declaration of Helsinki Principles.

Subcision procedures were performed under constant conditions by the same surgeon using a substantially identical method. Areas to be treated were determined after assessment of each patient's scarring and consultation with the patient. Before every procedure, instructions were given to stop, if medically logical, any drugs (e.g. aspirin, vitamin E) that could lengthen bleeding.

The subcision has been performed with use of an 18-gauge hypodermic needle (Nokor Admix, Becton Dickinson Co.; fig. 1). One side of the face underwent subcision and the other side subcision in conjunction with subdermal implant (absorbable plain catgut suture size 0).

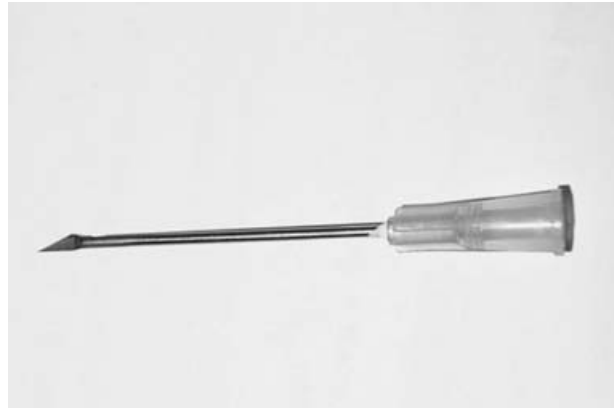


fig. 1 Nokor Admix, Becton Dickinson Co., 18-gauge.

First, the scarred area is marked and subcutaneous anaesthesia (lidocaine 1% with epinephrine 1 : 100 000) performed then the needle is inserted with blade facing upward, at the periphery of the scarred area. Afterward, it is turned so that the tip is in a horizontal orientation (parallel to skin surface) just below dermal-subcutaneous junction plane and gently swept across the site. In addition, a gentle piston like motion has been used to advance needle through fibrous band to release them.² We did the procedure in two directions in each scarred area.

In one side of the face, we insert absorbable plain catgut suture as a subdermal implant under the subcised scar through the needle insertion puncture. We cut a piece of the suture according to the size of the subcised scar and put it at the insertion puncture of the needle and then push the suture forward under the scar through the insertion aperture with help of the Nokor needle. These implants completely placed under the scars. Afterward, topical antibiotic were applied on the subcision sites and a dressing for 24 h.

All the patients were visited a week after procedure to denote complications such as swelling, bruising and infection. Photographs were taken before treatment as well as 1 month and 6 months following treatment with the same digital camera. Moreover, each patient was examined in every visit by two blinded qualified inspectors. The observers (one board certified dermatologist and a dermatology resident) were asked to grade each treated side based on 'before' picture and 'after' clinical assessment. The grading scale consisted of rating the improvement of the scar areas: no improvement, < 25%; mild improvement, 26% to 50%; moderate improvement, 51% to 75%; and marked improvement, > 75%.

Additionally, the patients were examined and asked to note their assessment of their scar improvement and unpleasant adverse effects.

The data finally were analysed with software SPSS-12 using non-parametric and independent *t*-tests.

Results

Twenty-two patients (10 male and 12 female) were treated with subcision according to the mentioned method. Twenty cases completed the study, 9 male (45%) and 11 female (55%), and two cases were lost to follow-up. The mean age of patients was 28.2 ± 4.67 years. The mean duration of disease was 8 ± 2.20 years, and the mean number of scars was 14.3 ± 6.74 . All patients had previous acne treatment with topical, oral antibiotic, topical retinoid and even isotretinoin. Twelve cases (60%) show mild improvement 1 month after subcision, and 8 cases (40%) showed moderate improvement. Among those who received subcision with subdermal implant, 14 cases (70%) show mild improvement, and 6 cases (30%) showed moderate improvement. The rate of improvement after 6 months of treatment has been shown in Table 1 (fig. 2).

Six patients (60%) show no side-effect a week after surgery on the subcision side, but only 2 (10%) cases report no side-effects on the subcision implant side. Swelling were seen in 13 cases (65%) on subcision side, and 16 cases (80%) on subcision with implant side. Mild skin infection at the site of needle insertion were seen in one patient (5%) on subcision side, but 4 cases (20%) on subcision with implant side. However, all of them were successfully treated with topical antibiotics such as mupirocin. Skin bruising was seen in 2 cases (10%) on subcision side, but 7 cases (35%) on subcision with

implant side. None of the patients show any side-effect 1 month after intervention. No cases of hyperpigmentation or hypertrophic scar were seen.

The mean patient assessment of improvement with this treatment was $59.5 \pm 1.57\%$ on subcision side, and $56.5 \pm 1.69\%$ on the subcision with implant side 1 month after intervention. These data were as follows 6 months after surgery: 53% (± 1.57) for subcision side and 51% (± 1.83) for the subcision with implant side. The entire patients report no unpleasant effect of treatment after 1 month.

The rate of improvement shows no significant difference between these two side ($P > 0.05$, Wilcoxon Test) both in 1 or 6 months after procedure. Likewise, the patients' assessment of efficacy shows no significant difference with use of implant ($P > 0.05$, Wilcoxon test). The incidence of the adverse effects such as swelling or infection shows no significant difference, but skin bruising occurred more frequently on the implanted side with insignificant but considerable difference ($P = 0.04$, Wilcoxon test). There was a significant correlation between investigator and patient assessment of improvement ($P < 0.05$, independent *t*-test).

Table 1 The response 6 months after treatment

Improvement	None	Mild	Moderate
Subcision	2 (10%)	14 (70%)	4 (20%)
Subcision with implant	3 (15%)	15 (75%)	2 (10%)

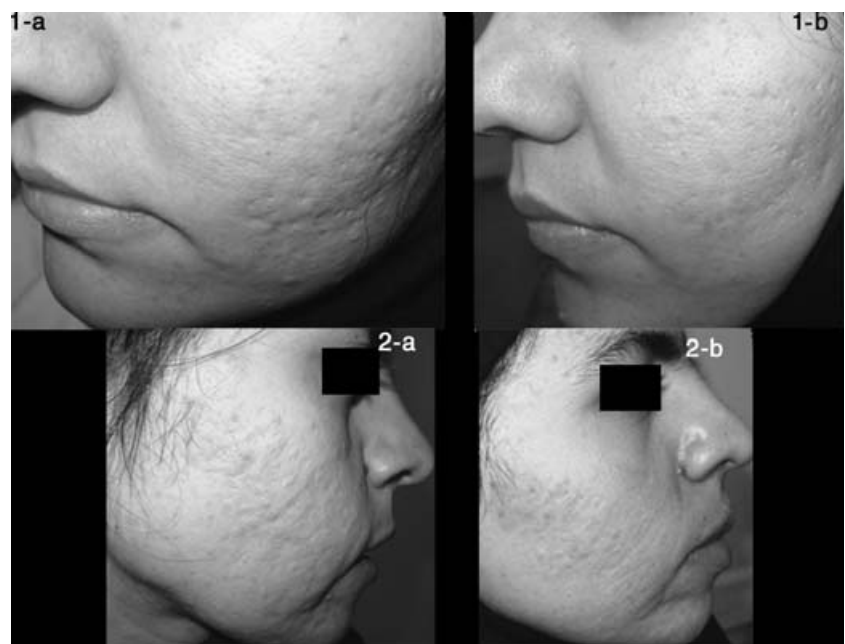


fig. 2 The considerable improvement of rolling acne scars on the face of a 28-year-old woman who has undergone subcisions for each visible scar. We did the procedure in two directions in each scarred area. (1-a) Before and (1-b) 6 months after treatment. Marked improvement of facial scars of a 24-year-old woman 6 months after subcision. She has undergone subcisions for each visible scar in two directions. (2-a) Before and (2-b) after treatment.

Discussion

Many methods have been proposed for the treatment of acne scars with variable cosmetic results. Subcision has been successfully used, although minor complications sometimes took place.¹⁴ Subcision proposed as a simple procedure for revision of many cutaneous deformities such as cutaneous scars, ear deformities and liposuction repair.^{15–17} Moreover, it seems to be efficient in the treatment of rolling acne scars. Any area on the face can be treated in minutes with an inexpensive specialized needle. Treated scars can become significantly less noticeable. Improved but somewhat persistent scars can be subcised again or further smoothed by a resurfacing technique, such as laser resurfacing.¹⁸ Subcision accompanies with more compliance due to lack of need to any sophisticated care after procedure.

There are only few studies assessing the efficacy and safety of subcision in the treatment of acne scars. In our study, almost all the patients showed at least mild improvement with this procedure. The mean self-assessment of patients' improvement was above 50%. Moreover, there was not any persistent side-effect lasting more than a few weeks. These adverse effect were confined to local oedema, bruising or mild cutaneous infection that they easily managed with cold compress and topical antibiotic, respectively. The incidence of side-effects does not differ with use of implant in conjunction with subcision despite the presence of the suture as a foreign material. The low incidence of adverse effects led to the satisfaction with treatment. Both investigators and patients find that subcision improves the rolling acne scars.

In a recent study by Alam *et al.* interestingly, similar results have been reported. They assessed the efficacy of subcision in 40 patients with rolling acne scars and find a mean improvement of 50% by patients and doctors.⁷ An improvement of such extent is particularly considerable given the ease of the subcision procedure and the lack of substitute procedures for treating rolling scars. Moreover, the side-effects are minimal to negligible, with patients, at most, complaining occasionally of transient bruising or oedema.

The use of these implants may cause an inflammatory response leading to fibrous tissue formation in the subcised area and theoretically improved the result of subcision. However, there are only very few studies to assess the efficacy of subdermal implant such as autologous fat or collagen to enhance the subcision efficacy.¹⁹ In our study, we use absorbable plain catgut suture as an implant in one side of the face in conjunction with subcision. In spite of the mentioned theoretical hypothesis, there was no significant improvement with use of this

implant, and it seems that subcision itself is responsible for scar revision.

Although the rate of side-effect was not different with use of this implant, it would be better not to insert implant under subcised area to avoid discomfort for the patient and increased risk of infection or bruising.

Our idea of using catgut as filler, which is known for its immunologic reaction and risk of granuloma, to produce a fibrous reaction is original. There may be different reasons why no difference was observed between the subcision and the subcision catgut. The location of this filler, dermis or hypodermis, may have some effect. The nature of catgut suture not to create significant fibrosis seems to be imperative. In the literature review, no conclusions were found that even when there is prolonged inflammatory reaction that fibrosis will result in conjunction with catgut suture. In this regard, further comparative controlled studies with use of other recognized filler could be helpful to answer this paradox.

Subcision seems to be a safe, simple, well-tolerated and valuable surgical procedure for some types of acne scars and for patient unwilling to undergo more complex procedure. In this regard, it is a useful tool for dermatologists who perform scar revision with considerable rate of improvement and patients' satisfaction. However, more controlled studies to assess the efficacy and safety of this procedure and additional effect of the subdermal implant would be fruitful in this regard.

References

- 1 Rapp DA, Brenes GA, Feldman SR. Anger and acne: implications for quality of life, patient satisfaction and clinical outcome. *Br J Dermatol* 2004; **151**: 183–189.
- 2 Jacob CI, Dover JS, Kaminer MS. Acne scarring: a classification system and review of treatment options. *J Am Acad Dermatol* 2001; **45**: 109–117.
- 3 Sawcer D, Lee HR, Lowe NJ. Lasers and adjunctive treatments for facial scars: a review. *J Cutan Laser Ther* 1999; **1**: 77–85.
- 4 Aronsson A, Eriksson I, Jacobsson S, Salemark L. Effects of dermabrasion on acne scarring: a review and a study of 25 cases. *Acta Derm Venereol* 1997; **77**: 39–42.
- 5 Krauss MC. Recent advances in soft-tissue augmentation. *Semin Cutan Med Surg* 1999; **18**: 119–128.
- 6 Orentreich DS, Orentreich N. Subcutaneous incisionless (subcision) surgery for the correction of depressed scars and wrinkles. *Dermatol Surg* 1995; **21**: 543–549.
- 7 Alam M, Omura N, Kaminer MS. Subcision for acne scarring: technique and outcomes in 40 patients. *Dermatol Surg* 2005; **31**: 310–317.
- 8 Luis-Montoya P, Pichardo-Velazquez P, Hojyo-Tomoka MT, Dominguez-Cherit J. Evaluation of subcision as a treatment for cutaneous striae. *J Drugs Dermatol* 2005; **4**: 346–350.

- 9 Haxsel DM, Mazzucco R. Subcision: a treatment for cellulite. *Int J Dermatol* 2000; **39**: 539–544.
- 10 Fan YM, Wu ZH, Li SF, Chen QX. Axillary osmidrosis treated by partial removal of the skin and subcutaneous tissue en bloc and apocrine gland subcision. *Int J Dermatol* 2001; **40**: 714–716.
- 11 Gold MH. Fibrel. *Dermatol Clin* 1995; **13**: 353–361.
- 12 Marianowski L, Barcz E. [Biologic tissue response to sutures]. *Ginekol Pol* 2004; **75**: 570–577.
- 13 Gabrielli F, Potenza C, Puddu P et al. Suture materials and other factors associated with tissue reactivity, infection, and wound dehiscence among plastic surgery outpatients. *Plast Reconstr Surg* 2001; **107**: 38–45.
- 14 Fulchiero GJ Jr, Parham-Vetter PC, Obagi S. Subcision and 1320-nm Nd: YAG nonablative laser resurfacing for the treatment of acne scars: a simultaneous split-face single patient trial. *Dermatol Surg* 2004; **30**: 1356–1359.
- 15 Goodman GJ. Therapeutic undermining of scars (Subcision). *Australas J Dermatol* 2001; **42**: 114–117.
- 16 Sommer B, Bergfeld D, Sattler G. [LipoRepair. Approach to correction of fat tissue deformities]. *Hautarzt* 2004; **55**: 605–610.
- 17 Karacalar A, Demir A, Yildiz L. Subcision surgery for the correction of ear deformities. *Aesthetic Plast Surg* 2004; **28**: 239–244.
- 18 Branson DF. Dermal undermining (scarification) of active rhytids and scars: enhancing the results of CO₂ laser skin resurfacing. *Aesthet Surg* 1998; **18**: 36–37.
- 19 Pinski KS, Coleman WP. Microlipoinjection and autologous collagen. *Dermatol Clin* 1995; **13**: 339–351.