

# Autologous Microlipoinjection In Some Skin Disorders

Tag El-Din E Anbar MD, Ashraf M E Al-Sawy MD, Hamza  
Abdel-Raouf MD and Hossam M Abdel-Wahab MSc

## Abstract

**R**ecently, interest in the role of fat transplantation for soft tissue augmentation has been renewed. Microlipoinjection involves extracting and reimplanting adipose tissue by a closed technique. This study was conducted on 18 patients who attended the Dermatology Outpatient Clinic of Al-Minya University Hospital with various skin disorders. Local anaesthesia with tumescent technique was employed using the modified Klein's solution. Fat was harvested and the defect was filled to its maximal capacity, causing intentional overcorrection to compensate for fat absorption. Excellent results were obtained in 7 patients (39%), good results in 7 (39%) and poor results in 4 (22%). Patients with linear morphea and post DLE scar, all showed excellent results. Up to 50% of patients with postacne scars showed poor results. Complications were few, mild and temporary. Fat graft longevity was variable and ranged from one month to 9 months. We can conclude that autologous

microlipoinjection is simple, safe, effective, inexpensive and non-allergenic technique. The main drawback is the short-lived improvement. The procedure can be used in concert with other forms of facial rejuvenation and with other forms of soft tissue augmentation.

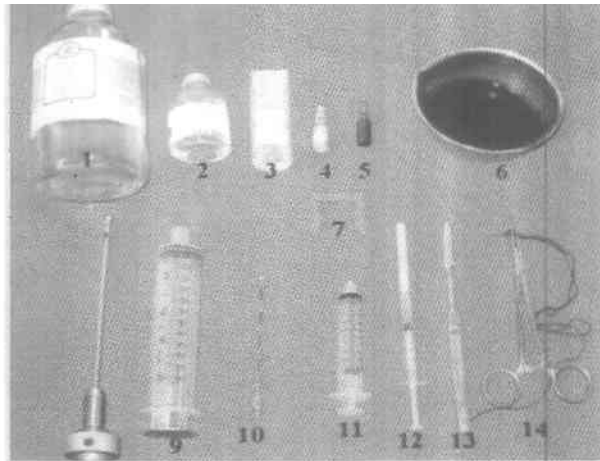
## Introduction

Soft tissue augmentation has become increasingly important as more individuals seek aesthetic improvement without major surgical procedures. The choice of an appropriate subcutaneous implant requires a thorough understanding of the materials available<sup>(1)</sup>. Soft tissue fillers are classified according to their origin into autogenic, xenogenic, homogenic, and synthetic<sup>(2)</sup>. Autologous fat transplant and injectable bovine collagen are still considered the commonest implant material employed in soft tissue augmentation<sup>(3)</sup>.

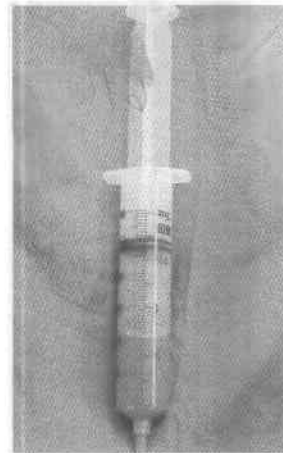
Fat transplantation surgery dates back to almost one century ago after reported the successful use of free fat transplant to reconstruct a depressed facial defect<sup>(4)</sup>. The modern phase of fat transplantation began in 1976 when Fischer and Fischer demonstrated fat extraction with the cellusuctiotome<sup>(5)</sup>. Illouz<sup>(6)</sup> simplified and introduced the concept of blunt dissection - vaccum - assisted liposuction. Liposuction provided the cosmetic surgeon access to an abundant supply of viable adipose tissue. In 1986, Fournier<sup>(7)</sup> presented his modification of fat-grafting technique that is called "Microlipoinjection" and continued the trend toward smaller grafts. Microlipoinjection involves extracting and reimplanting adipose tissue by a closed technique. A syringe and microextractor are the only instruments required.

This study aimed at evaluating the technique of autologous microlipoinjection in reconstruction of some skin disorders.

Department of Dermatology, STDs & Andrology, Faculty of Medicine, Al-Minya University.



**FIG. 1.** Set of autologous microlipoinjection: (1) Lactated Ringer's solution (2) Lidocaine 2% bottle (3) Sodium Bicarbonate 8.4% ampule.(4) Adrenaline 1:1000 ampule (5) Mediazolam ampule (6) Povidone Iodine (7) Snap Twist Locker (8) Concorde Toomey Cannula (9) 60-ml syringe with Toomey tip (10) A 17-gauge Tuohy needle (11) Luer Lok 10-ml syringes (12) Insulin syringe (13) Scalpel and its blade no. 11.(14) Needle holder, silk suture and cutting needle.



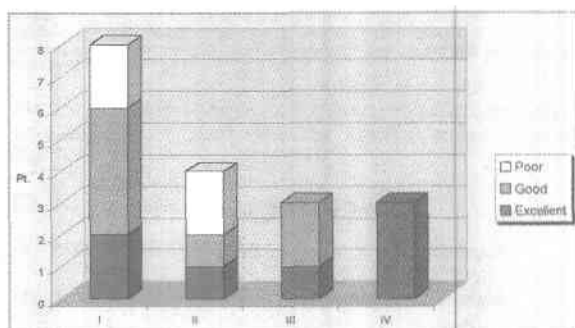
**FIG. 2.** The liposuction syringe contains the aspirated fat (above) & the unwanted material as serum, blood & liquefied broken adipocytes (below).

### Patients and Methods

The study was conducted on 18 patients attending the Dermatology Outpatient Clinic of Al-Minya University Hospital with various skin disorders. The patients were divided

into 4 groups: post-traumatic scars (8 pts), post-acne scars (4 pts), post-chickenpox scars (3 pts), and a miscellaneous group which included post DLE atrophic scar (2 pts) and linear morphea (1 pt).

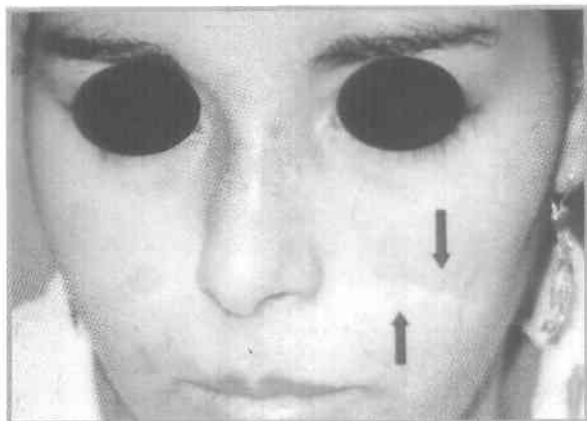
Each patient was subjected to full history taking, written consent,



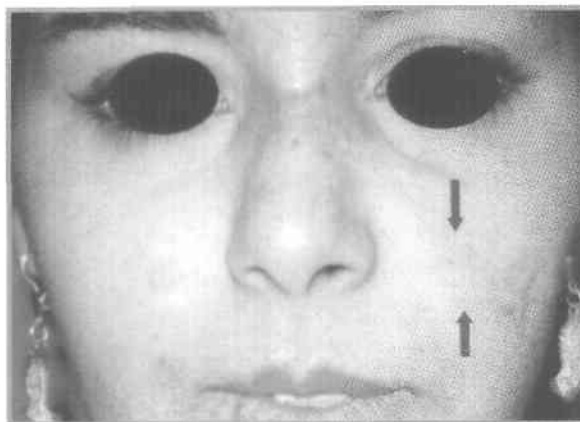
**FIG. 3.** Results of Microlipoinjection in each group.

examination and photography before, during, immediately after and at fixed times in the follow up period.

The donor site was marked with the patient standing. Typical donor sites included the abdomen (14 pts) and buttocks (4 pts). The set used in autologous microlipoinjection is illustrated in Fig. (1). Local anaesthesia with tumescent technique was employed using the modified Klein's solution (Table 1). A small stab wound incision was made with No 11 scalpel blade at the periphery of the donor site allowing access to the subcutaneous compartment. The Concorde Toomey cannula attached to 60-ml syringe with Toomey tip was inserted via the stab wound incision for manual liposuction. The negative pressure needed was maintained by application of the snap Twist Locker to the syringe. During the entire procedure, the skin was constantly palpated by the left hand and pinched to feel the thickness of fat. The needle and cannula were moved back and forth several times in the same tunnel, after which the maneuver was repeated in a radial fashion until sufficient fat had been aspirated.



**FIG. 4.** Post-traumatic scar before autologous microlipoinjection.



**FIG. 5.** Post-traumatic scar after autologous microlipoinjection.

After harvesting the desired amount of fat, cannula was removed and the stab wound was sutured with a single simple silk suture. The syringe was filled, capped and maintained in an upright position for 5-10 min. This reduced the material to be injected to practically pure fat as serum, blood, liquefied broken adipocytes collected at the bottom by gravitational pooling (Fig. 2). This unwanted material was then discarded and pure fat was transferred to LuerLok 10-ml syringe to which was attached a 17-gauge Tuohy needle. The needle was inserted into the subcutaneous layer (parallel to skin surface) of the area to be

corrected till reaching its most distal point. As the plunger was gently pushed in, the needle was slowly withdrawn in a retrograde fashion. The defect was filled to its maximal capacity, causing intentional overcorrection to compensate for the expected decrease in volume from absorption of fluid and non-viable cellular material.

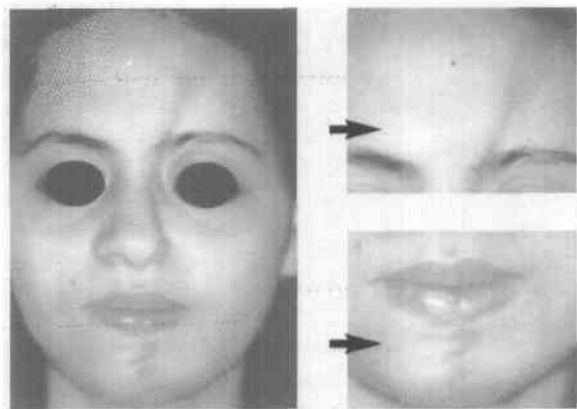
Post-operative care was simple with application of antibiotic cream to the puncture site for 3-5 days.

The results were evaluated and graded into excellent, good, and poor according to patient satisfaction and

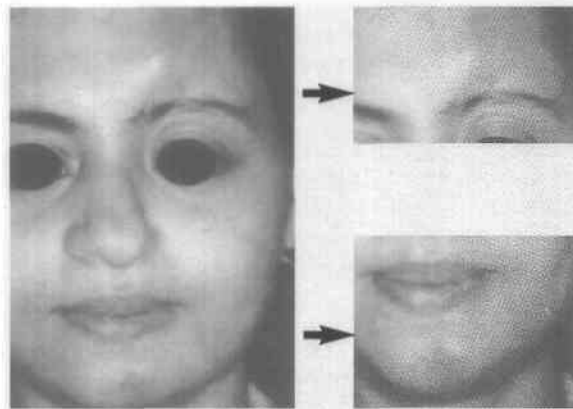
our opinion with pre-operative and post-operative photography.

## Results

The study was conducted on 18 patients. They were divided into 4 groups according to the type of the skin defect. The age of the patients ranged from 14 to 36 years with a mean and standard deviation (SD) of  $24.37 \pm 6.14$  years. The sex distribution of the patients has shown that females were 11 (61.1%), while males were 7 (38.9%).



**FIG. 6.** Linear Morphea before autologous microlipoinjection.



**FIG. 7.** Linear Morphea after autologous microlipoinjection.

Abdomen was the preferred donor site in 14 patients (78%), while buttocks were chosen in the remaining 4 patients (22%). The face was the recipient site in all cases.

The results were evaluated throughout the study. Excellent results were obtained in 7 patients (39%), good results in 7 (39%) and poor results in 4 (22%).

Fat graft longevity was variable and correction had lasted for one month in 2 cases (11.1%), 2 months in 5 (27.8%), 3 months in 6 (33.3%), 5 months in 4 (22.2%) and for 9 months in only 1 patient (5.6%) (Table 2).

The results were recorded on each group of the patients (Fig. 3) as follows:

#### **Group I:**

This group included 8 patients with post-traumatic scars. Excellent results were obtained in 2 cases (25%), good results in 4 cases (50%) and poor results in 2 cases (25%) (Fig. 4&5).

#### **Group II:**

This group included 4 cases with post-acne scars. Excellent result was obtained in only 1 patient (25%), good result in another patient (25%), while poor results were obtained in 2 patients (50%).

#### **Group III:**

This group included 3 cases with post-chickenpox pits. Excellent result was obtained in 1 patient. Good results were obtained in the other 2 patients.

#### **Group IV:**

This group included 3 patients with miscellaneous disorders. Excellent results were obtained in all cases with satisfying correction of skin defects due to linear morphea (Fig. 6&7) and post DLE atrophy.

Post-operative complications included minimal bruising, pain, edema, and erythema. They persisted

for less than 24 hours and rarely up to 72 hours. None of our patients experienced true complications as long lasting lumping or blindness.

## **Discussion**

Since its introduction, autologous fat transplantation has been used with success for aesthetic and corrective defects. There are many conditions that have been treated with the use of fat transplantation. However, the common indications include: morphea, DLE, acne scars, facial hemiatrophy, and hand rejuvenation<sup>(8)</sup>.

The tumescent technique of liposuction used in our study enabled us to harvest large quantity of fat easily and effortlessly. None of our patients was in need for fluid or blood transfusion. This is consistent with Pitman et al<sup>(9)</sup> who reported that the tumescent technique can serve as a complete fluid replacement regimen. We did not use systemic antibiotics in the pre or post-operative period. It is well known that the tumescent technique is associated with remarkably low risk of post-operative infections. In 1999, Klein reported the antibacterial effects of the tumescent local anaesthesia<sup>(10)</sup>.

In our study, typical donor sites included the abdomen (14 pts) and the buttocks (4 pts). Other studies<sup>(11,12)</sup> reported that the lateral thigh is the ideal donor site. Chajchir and Benzaquen<sup>(13)</sup> reported that thigh, abdomen, pubis, hips, and gluteal areas all have been shown to be equally good.

The harvested fat was not subjected to any sort of treatment as washing, insulin or centrifugation. Excessive washing or manipulation may be detrimental to the survival of fat cells. Washing in a saline solution will cause loss of fibrin, which aids in adhesion of the injected material to the

surrounding tissue<sup>(13)</sup>. Chajchir et al<sup>(14)</sup> reported that profusing the fat cells with insulin increases resorption and centrifugation completely destroys the cells.

Because some fat absorption was unavoidable, it was necessary to compensate by over-injection of fat. Some surgeons<sup>(13)</sup> recommended overcorrecting the defect by 30-50%.

As regards longevity, long-term results are still variable but are becoming more predictable as further experience is accumulated<sup>(8)</sup>. In our study, up to 70% of cases showed significant fat absorption within 3 months of lipoinjection. The volume of fat, when surgically removed from the donor site, becomes ischemic. After transfer into the recipient site, some cells may die, some survive as adipocytes, and other differentiate into pre-adipocyte cells<sup>(15)</sup>. The pre-adipocyte cells, after recovery from the transfer process, can accumulate fat and mature into adipocytes. Ultimately, the fat graft regains its blood supply from the periphery, and those cells that have survived will remain and function. Those that die will be cleared and replaced by fibrosis, which itself may add to the volume of augmentation<sup>(4)</sup>.

In our study, in treating patients with post-traumatic scar, the best results were obtained in patients with depressed and distensible scars that disappear when stretching the skin before the procedure. However, poor results were obtained in patients manifested with hyperpigmented and fibrotic scars despite proper correction. This is going with Ersek et al<sup>(16)</sup> who reported that injection into scarred areas seemed fraught with disappointment and difficulty. The higher resorption rate of the transplanted fat added more disappointment to patients seeking for long-lasting correction. Piniski and Roenigk<sup>(17)</sup> explained that by the

avascular nature of this fibrotic tissue that impacts graft survivability.

We obtained poor results with rapid resorption of the grafted fat in up to 50% of patients with post-acne scars. This is going with Lewis<sup>(18)</sup> who reported that the treatment of acne scars would be a very difficult deformity to correct with fat grafts. Ersek<sup>(19)</sup> also found no significant improvement in acne pits 6 weeks after autologous fat transplantation. Pinski and Coleman<sup>(8)</sup> reported that the chance of correction of pitted acne

scars or pure dermal defects by fat graft is unlikely. This renders the technique not an ideal procedure for correction of postacne scars.

In our study, the excellent results obtained in correction of linear morphea and DLE scar are consistent with the study of Pinski and Coleman<sup>(8)</sup> who reported that both defects responded quite well to microlipoinjection.

Few complications in the form of temporary swelling and minor

bruising at the recipient site and mild tenderness at donor site have been recorded in our study. This is consistent with other studies<sup>(20,21)</sup> which concluded that autologous fat transplantation is a safe procedure.

Autologous microlipoinjection is simple, safe, effective, inexpensive and non-allergenic technique. The main drawback is the short-lived improvement. The procedure can be used in concert with other forms of facial rejuvenation and with other forms of soft tissue augmentation.

**Table (1):** Modified Klein's solution.

20 ml of 2% lidocaine
1 ml of epinephrine 1:1000
5 ml of sodium bicarbonate (8.4%)
500 ml lactated Ringer's solution

**Table (2):** Fat graft longevity (whole study).

Duration	No. of Patients	%
1 month	2	11.1%
2 months	5	27.8%
3 months	6	33.3%
5 months	4	22.2%
9 months	1	5.6%

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