

Fat Injection: An Effective Method for Aging Hand Dorsum Rejuvenation

ASHRAF EL-SEBAIE, M.D.; IHAB M. KHALIFA, M.D., M.R.C.S.* and ADEL M. WILSON, M.D.

The Department of General and Plastic Surgery, Faculty of Medicine, Cairo University and Helwan University Hospital.*

ABSTRACT

Background: The skin undergoes atrophy with aging. This process typically begins during the fifth decade of life. The loss of subcutaneous fat which also occur with aging aggravate the appearance of the thinned aged skin [1].

Patients and Methods: This study included 50 patients, females with thinned (atrophied) hand skin who presented to Plastic Surgery Clinic in the period from June 2006 to December 2007. Usually the procedure was done as part of another plastic surgery procedure dealing with another aging process.

Results: Clinical results were satisfactory. Oedema was noted in the recipient site (hand), which usually resolves spontaneously within 14 to 28 days. The donor site suffered the usual known manifestations of fat harvesting including ecchymosis and pain sensation which were both minimal and need no specific treatment.

Conclusion: We concluded that fat injection under atrophied skin of the dorsum of hand is a very useful effective and practical method of improving the shape of the aged hand.

INTRODUCTION

Although the popularity of fat transplantation is a relatively recent development in plastic surgery, the concept of fat transfer is not new. As early as 1893, free fat autografts were used to fill a soft tissue defect [2]. The use of autogenous abdominal fat to correct deficits in the malar area and chin was reported in 1909. Throughout the early part of the 20th century, attempts were made to correct other conditions, including hemifacial atrophy and breast defects, but modern fat grafting did not develop until the early 1980s with the popularity of liposuction [3].

Fat grafts have become an important, necessary, and reliable procedure in plastic surgeons routine practice. A few years ago, most plastic surgeons did not believe that fat grafts would have long term survival in subjects. Those who believe that fat grafts develop unpredictable results either have false information on the procedure or have used inadequate techniques [4].

The augmentation of soft tissue defects is a challenging problem. Lipoinjection of autologous fat is a safe and effective method for correcting depressions or thin soft tissues those results from aging, surgical complications, trauma, and various atrophic conditions [5]. The key of success of fat injection seems to depend on placing the grafts deeply, depositing them in several sites or thin rolls and then applying sufficient massage of the injected areas to ensure adequate dispersal of fat grafts [6].

PATIENTS AND METHODS

This study included fifty patients received at Plastic Surgery Clinic in Cairo University and Helwan University Hospital, in the period from June 2006 to December 2007.

They were all females. Their age ranged from 40 to 65 years. Eight patients presented postbariatric surgery because of loss of fat from dorsum of hand as part of whole body fat loss. Twelve patients presented in the early forties suffering from premature aging process in the hand. The rest of patients (Thirty patients) presented above fifty years of age with usual complain of loss of skin luster, thinning of skin and prominence of the bony skeleton of the dorsum of the hands.

Exclusion criteria included: Diabetics, hepatic, renal and patients of suspicious immune suppression for fear of fat graft infection.

Preoperative planning: First, carefully mark the recipient site with the patient's agreement either the dorsum of the hand only or extending to the proximal interphalangeal joint. Donor site is marked preferably in the posterior part of the trochanters or love-handle areas (Posterior fat cells).

Fat harvesting: The technique is designed to harvest the fat in parcels of readily transferable size. Liposuction cannula 2mm. We use local an-

esthesia (unless the patient is under general anesthesia for another procedure) to anesthetize the site for a small stab incision. Through this incision, infiltration cannula is introduced to deliver the tumescent fluid to anesthetize this region. The same site serves as the access for harvesting. Local anesthesia is used in the tumescent fluid even if the patient is under general anesthesia, as it has a remarkable analgesic effect in the early postoperative period. The choice of tumescent fluid varies. Following infiltration of the region to be harvested, we use an aspiration cannula connected to a syringe we do suction by hand using gentle passing motion for aspiration.

Transfer and purification: Once harvesting is complete, the harvested fat is irrigated with normal saline many times through a strainer to wash out the oil (from the ruptured fat cells) the lidocaine and the epinephrine. The resulting fat is finally transferred to sterile kidney basin and ampoule of garamycin is added before fat is injected in its new site.

Placement: Grafting in hand is done in tunnels starting from incision opposite the wrist, injecting in tunnels between the metacarpals and reaching distal to the 1st phalanx. The injection is done using special needle 1ml caliber fitted to 10cm syringe containing the prepared fat. Gentle massage of the injected fat is usually needed to evenly disperse the injected fat in a uniform pattern. The massage is in a distal direction and is done while blocking the injection site to prevent the escape of the fat. The injection site is usually closed by a single absorbable stitch. The donor site incision is usually closed also by single stitch and light compression is applied for 3 weeks to minimize the postoperative oedema.

Postoperative care: Full course of antibiotic is given during the first 7 to 10 days. Trental 200mg is given twice daily to improve the graft perfusion for three to four weeks. Compression gloves are used for three weeks postoperatively. Collagen preparation is used topically starting from 3rd postoperative day and afterwards for 6 weeks. Anti-inflammatory are used maximally for 1 week. Discourage massage immediately following fat grafting. These restrictions are to prevent migration of fat

away from the desired areas of treatment. Patients should be seen in the first week postoperatively to check the donor and recipient sites. Some edema and a minimal amount of bruising may be apparent; reassure patients. An additional follow-up appointment should be made for approximately 6-8 weeks. At this point, most of the edema has subsided, and early results can be assessed. If a repeat procedure is to be performed, a waiting period of 3 months is prudent to allow the first graft to revascularize and to allow any edema to resolve.

RESULTS

In our study, the aged ranged between 40-70 years, 20 patients were between 40-50 years, while 6 patients were between 50-60 years, and lastly 24 patients were over 60 years (Table 1).

Clinical results showed good take of the grafted fat with minimal or no complications. Apart from the temporary edema occurring for 2 to 3 weeks, and subsiding spontaneously, there were no other clinical complications. Subjectively, the even pattern of fat distribution in the hand needed in some cases to be manipulated in the first postoperative visit, which usually end the problem. Regarding the donor site, the ecchymosis completely subsided in 2 to 3 weeks.

Volume of injected fat: Varies from case to another, we divided the cases according to amount into 3 categories; small amount ranging between 10-15ml fat/hand, moderate amount ranging between 16-20ml fat/hand and large amount ranging between 21-25ml fat/hand.

During our follow-up period, minor complications were noticed including oedema, ecchymosis, inflammation (redness and pain) which is most probably chemical aseptic inflammation, irregularities that can be massaged and smoothed easily by finger pressure in the first postoperative week. Side effects can be related to age and amount injected as shown in Table (2).

Table (1): Age predominance in patients with fat injection of hand dorsum.

Age (years)	40-50	50-60	60-70
No. of patients	20	6	24

Table (2): Relation of volume of fat injected to age and complications.

No. of cases	Age	Fat volume injected	Pain	Ecchymosis	Oedema	Inflammation	Localized hardness
5	≥65	Large	+++	++	++	+	+
3	≥65	Moderate	++	++	++	+	-
6	40-50	Moderate	+	+	+	-	-
2	40-50	Mild	+	+	+	-	-
32	50-60	Large	++	++	++	+	-



Fig. (1): Preoperative photos showing atrophy of subcutaneous fat of hand dorsum.

Fig. (2): Intraoperative Lipoinjection procedure using the special cannula and Lipoinjection gun.



Fig. (3): A female patient 68 years of age, fat injection of 15ml each hand was done twice with 15 months apart.



A- The right Hand injected, Left still not injected.



B



C



D

B-C-D- Late post operative photos (18 months).

Fig. (4): 39 years old female with excessive loss of weight after bariatric surgery with 25ml fat injected in each hand dorsum.

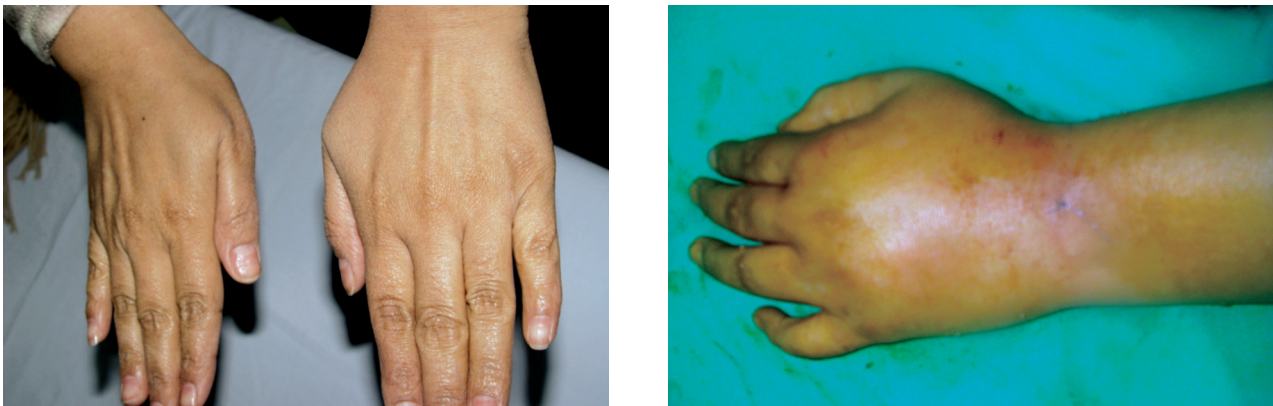


A- Preoperative markings with prominent dorsal veins and tendons.

B- Intraoperative view with post lipoinjection of 25ml purified fat in each side.

C- After 6 months follow-up.

Fig. (5): A case of 42 years old patient with injection of 30ml on each hand dorsum.



A- Preoperative.

B- Immediately postoperative.



C

C&D- 4 weeks postoperative.

D



Fig. (6): Injection of 24ml of fat grafts in each hand in 65 years old female preoperatively and 4 months postoperatively.

DISCUSSION

Over the past 15 years, more wide spread clinical use of autologous fat grafts suggest that this procedure is the best presently available. In many ways, fat is the closest we have to an ideal filler; it is readily available and inexpensive; it is autologous and therefore lacks a host immune response, it is safe and non-carcinogenic and it is easily acquired with a minimally invasive procedure. Drawbacks to the procedure seem limited but the need for a surgical procedure (as opposed to office-off-the shelf injectable fillers) [7].

Despite the clinical optimism associated with autologous fat transfer, there remains an uncertainty among practitioners regarding the viability of transferred fat [8].

In this study we use standard tumescent solution which consists of 1mg of epinephrine, 200mg of lidocaine, and 5mEq of sodium bicarbonate in 1L of normal saline [9]. Also the donor site is marked preferably in the posterior part of the trochanters or love-handle areas (posterior fat cells) [10].

The goal with any grafting procedure is to gently apply the graft to a well-vascularized bed to maximize graft take. Every part of the graft should be within 1.5mm of living, vascularized tissue. If a large area is grafted, the central area, which is mostly remote from the blood supply, may not survive. Still, some clinical evidence shows good lipografting survival in some tissues that are not well-vascularized [11].

In this study, it is obvious that fat injection at the dorsum of the hand can persist with 90% patient and doctor satisfaction after 6 months. Moreover, 50% of our cases, with 1 year follow-up retain the fat graft coinciding with Kaminer and Omura who reported their clinical experience with over 250 patients stating that correction of soft tissue defect using autologous fat grafting lasted for 5 years and more [12].

We believe that long-term survival of fat grafts depend on many factors; most important is the caliber of aspiration and injection cannula. We prefer injection through 2mm blunt ended cannula (macro-fat graft) and aspiration through 3mm cannula.

Lastly, we can conclude that, macro fat grafts is an effective and safe method for replacing the atrophied subcutaneous fat of the hand dorsum regaining the youthful hand appearance specially in elderly and after massive weight loss in younger age groups with almost no complications.

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