

Autologous fat graft in aging face



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Autologous fat graft is becoming a widely used procedure in plastic surgery, thanks to its different and remarkable properties. In the 19th century the first techniques of autologous fat graft were described to treat congenital deformities and complex traumatic wounds with soft tissue loss after oncologic demolishing surgery. During the 20th century and the last 10 years, many studies have been published with the purpose to analyse the composition of adipose tissue and to discover its possible benefits. These studies allowed to shift its use from a simple filler to a more important role in regenerative medicine. Thus, autologous fat graft is now used for both reconstructive and aesthetic purposes. It is just in this “regenerative context” that the role of autologous fat graft fits in cosmetic medicine. More and more patients ask to treat aging effects on their body, and – especially – the request to obtain face rejuvenation is gradually growing. It is now understood that aging face is not simply a result of gravity, but also a result of volume loss secondary to the atrophy of tissues. Considering our experiences using autologous fat graft procedure in treatment of scar outcomes and burns, we have decided to use this procedure also in the field of aesthetic surgery and, particularly, in aging face treatment. From January 2010 to January 2011, we performed 32 autologous fat graft procedures to obtain facial rejuvenation in patients aged from 38 to 69 years, taking advantage of both filler and regenerative effect. This is a minimally invasive procedure, which allowed us to always observe important improvement in skin trophism, color, softness, plicability and elasticity. The procedure is well tolerated by patients and allows an almost immediate resumption of daily activities. The procedure has showed to be quick, relatively simple, painless and virtually free of complications, becoming increasingly used in aesthetic surgery, particularly in facial rejuvenation.

Key words: Autologous fat graft, Aging face.

INTRODUCTION

Autologous fat graft is becoming a widely used procedure in plastic surgery, for its different and remarkable properties ¹. The indications of this procedure range from the aesthetic to the reconstructive surgery, considering both filler and regenerative effects of adipose tissue.

Historically, the use of fat to treat congenital deformities and complex traumatic wounds with soft tissue loss after oncologic demolishing surgery, was first proposed in 1893 by *Neuber* ², by *Hollander* in 1912 ³, by *Neuhof* in 1923 ³ and *Josef* in 1931 ⁴.

Since 1980, several papers have highlighted different findings on fat transplantation obtained by liposuction ⁵, but adipose cell vitality has been a controversial subject, with survival rates ranging from 30% to 70% ⁶.

In 1992, *Coleman* described a new method to improve adipose cell survival and now his technique is one of the most widely used ^{1,8}. At the same time, fat has been investigated and multiple microstructural studies have been developed. Adipose tissue showed to contain an extracellular matrix (e.g., collagen, laminin, fibronectin, growth factors) and cellular components (adipocytes and many other factors) ⁹. Moreover, recent interest has focused on adipose stem cells, which are capable of differentiating into variable cell lineages, such as cartilage, bone, muscle and nerve ¹⁰⁻¹⁵.

The study of the composition and functions of adipose tissue has allowed to shift its use from a simple filler to a more important role in regenerative medicine ⁵. Proven properties of tissue regeneration have been exploited for the treatment of dystrophic tissues and scar outcomes – as a result of trauma or surgery – in different areas of the body ⁷.

It is just in the “regenerative context” that the role of autologous fat graft fits also in cosmetic medicine.

More and more patients ask to treat aging effects on their body, and – particularly – the request to obtain face rejuvenation is frequently asked ¹⁶.

For years, face lifting has been the most used procedure to obtain facial rejuvenation, but patients have an increasing desire to undergo minimally invasive procedures with a short recovery time ^{5,16}.

It is now understood that aging face is not simply a result of gravity, but also a result of volume loss secondary to the atrophy of tissues ¹⁷.

Adipose tissue is an ideal substance for tissue augmentation: it is abundant in many people, it is easy and quick to be harvested and to be transplanted; it is an autologous component and – in this way – it is unable to elicit rejection reactions ¹⁸.

Our experiences using autologous fat graft procedure fits in the field of reconstructive surgery: correction of scar outcomes and burns ¹⁹⁻²¹. Considering obtained results (improvement in skin trophism, elasticity, color, plicability), we have decided to use autologous fat graft also in the field of aesthetic surgery and, particularly, in aging face treatment.

In these cases, patients’ main request is always to obtain facial rejuvenation through a minimally invasive procedure with short recovery time and, for these reasons, autologous fat graft is an optimal surgical technique. In our experience, we used this technique both alone and in association with other surgical procedures for the treatment of aging face, such as blepharoplasty and face lifting.

MATERIALS AND METHODS

From January 2010 to January 2011, we performed 32 autologous fat graft procedures to obtain facial rejuvenation in patients aged from 38 to 69 years.

We are used to perform the surgical procedure under local anesthesia and sedation assisted with sterile technique.

Abdomen and/or trochanteric areas are the donor sites selected for the abundant reserves of adipose tissue and the absence of postoperative outcomes.

After the preliminary incision of the skin, we proceed to the infiltration of the donor areas using a blunt cannula (infiltration of 100 mL saline solution, 10 mL of levobupivacaine 7,5 mg/mL, 20 mL of mepivacaine 10 mg/mL and 0.5 mL epinephrine 1 mg/mL).

Adipose tissue is harvested through the same incision with blunt cannulae connected with a Luer-lock syringe of 10 cc.

The syringes obtained are then placed in a centrifuge with re-sterilized containers and adipose tissue is processed following *Coleman's technique* (i.e. centrifugated at 3,000 rpm for 3 minutes). After this procedure, adipose tissue is separated into three distinct layers, and we eliminate the top layer (made of oil derived from the breakdown of fat cells) and the lower level (with damaged blood cells, water and anesthetic mixture), in this way preserving only adipocytes and stromal-vascular tissue. "Purified" adipose tissue is then transferred in a syringe 1 mL Luer-lock that allows precise control of the amount of injected fat and better handling.

The adipocyte fraction is injected using an 18-gauge angiographic needle with a snap-on wing (*by Cordis®*, a Johnson & Johnson Company, N.V. 9301 LJ, Roden, Netherlands).

The adipose tissue fraction is always inserted into the dermo-hypodermic junction in all cases, with the use of small syringes described above. Through the same incision many radiating passages are made, in order to distribute fat in different directions according to an ideal form of a web to support superficial tissues.

This technique seems to allow better fat graft survival, to increases rooting and to minimize the possibility of forming cysts filled with triglycerides. The amount of tissue grafted depends on the extension of the area that has to be treated. The amount of injected fat at each passage is minimized to avoid irregularities and clusters, which are eventually deleted with digital manipulation after procedure. Injection is performed with retrograde tech-



Figure 1.

The patient underwent to surgical procedure of autologous fat graft at nasolabial folds, chin and cheekbones. Preoperative view.



Figure 2.

Preoperative view.

**Figure 3.**

Postoperative view at
2 months follow-up.

**Figure 4.**

Postoperative view at
2 months follow-up.

nique leaving a very small space between the injected tissue lines. We treat most frequently those areas which are classically subjected to aging effects: nasolabial folds, chin, lips and cheekbones.

The access incisions in the donor areas are sutured with nylon 4/0. Abdomen and/or trochanteric areas are medicated with an elastic-compressive dressing that must be kept in place for 5 days. In all cases, patients are discharged the same day of surgery.

RESULTS

In all patients we obtained a successful cosmetic result. While the filler effect is evident immediately after procedure, the regenerative effect seems to start about 1 week after surgery and to give a continuous improvement for at least 1 month. We always noted important improvement in skin trophism, color, softness, plicability and elasticity, thus obtaining a significant rejuvenation effect. At fifth post-operative day follow-up, patients never reported pain both in donor and recipient sites.

We have never had any complication, neither major (such as damage to facial structures or infection of surgical site) nor minor. The only reported side effect is, in almost all patients, the presence of minimal ecchymosis which disappear in 5-6 days.

DISCUSSION

In our experience in aesthetic surgery, we decided to use autologous fat graft not only as a mere filler, but also as a stimulus for tissue regeneration, particularly in treating aging face.

Autologous fat graft procedure showed to respond excellently to request from patients who want to obtain face rejuvenation with minimally invasive procedure.

This technique, used both alone and in association with other surgical procedures for the treatment of aging face – such as blepharoplasty and face lifting – has showed to be quick, relatively simple, painless and virtually free of complications. Patients are discharged in the same day of procedure and are able to resume normal daily activities already the day after surgery, thus minimizing discomfort related to the procedure.

Patients are generally satisfied considering aesthetic results both in a early and late follow-up

CONCLUSIONS

We think that autologous fat graft is the ideal procedure for patients who want to undergo minimally invasive surgery for facial

rejuvenation also if associated with blepharoplasty or face lifting.
Considering aging face, autologous fat graft is

becoming widely performed to achieve long-lasting regeneration effects without undergoing invasive surgery.

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