Correction of Nasojugal Groove With Tunnelled Fat Graft

Luis de la Cruz, MD; Beatriz Berenguer, MD, PhD; and Teresa García, MD

Background: Pronounced nasojugal sulcus (tear trough deformity) is a frequent and distressing symptom in aesthetic palpebral surgery. The sliding fat technique using the transcutaneous or transconjunctival approach has proven to be considerably useful in patients with clinically evident fat bags. In the absence of fat bags, commonly used techniques can lead to unpredictable (and frequently less than optimal) results.

Objective: The authors report their experience with correcting the nasojugal groove in the absence of palpebral fat bags by use of a one-piece, free fat graft as an alternative to autologous fat injections or the placement of alloplastic materials.

Methods: The authors conducted a retrospective study of a consecutive series of 34 patients (33 women and one man) between 42 and 57 years of age. In all cases, small, free fat grafts harvested from the medial fat compartment of the upper eyelid were placed precisely under the depression through two stab incisions in the suborbicularis plane, filling in the groove.

Results: Results were considered excellent in 24 out of the 34 patients. Results in the remaining 10 patients were rated as good, in most cases because of mild undercorrection. All patients expressed a high degree of satisfaction. Recovery time was very short and no eye or eyelid complications were observed.

Conclusions: Correction of the nasojugal groove with a tunnelled fat graft causes minimal tissue trauma and allows exact placement of the graft. The upper palpebral fat has unique characteristics that render it an ideal graft material for correction of the nasojugal groove in patients with no concomitant lower fat bags. This procedure offers more predictable results and a lower incidence of adverse effects than more commonly used techniques. (Aesthetic Surg J 2009;29:194–198.)

The authors are in private practice in Madrid, Spain.
Correction of Nasojugal Groove With Tunnelled Fat Graft

nique, it was not widely adapted until Hamra 7 popularized it and de la Plaza and de la Cruz 8 modified it by using the transconjunctival approach. When no fat bags were evident, Loeb placed small, free fat grafts intraseptally through a subciliary musculocutaneous incision, with dissection and exposition of the suborbicularis plane. The authors propose a modification of this latter technique, placing the grafts through two stab incisions (tunnelled), leaving the musculocutaneous plane intact.

PATIENTS AND METHODS

The authors conducted a retrospective clinical study of a consecutive series of patients in whom the nasojugal groove was corrected with a tunnelled fat graft. From January 2004 to May 2008, 34 patients (33 women and one man) ranging from 42 to 57 years of age (average 46.5 years) were treated by the same surgeon (LC). None had undergone previous eyelid surgery. All patients presented with a marked nasojugal groove without significant fat bags. Among them, five presented with an isolated tear trough deformity and 27 also presented with skin excess in the upper and/or lower eyelids.

OPERATIVE TECHNIQUE

The nasojugal groove was labeled with a surgical marker while the patient was awake and in a standing position.

Local anesthesia (2% lidocaine with 1:80,000 epinephrine) was injected into the upper and lower eyelids in the subcutaneous plane. This was combined with intravenous sedation or with general anesthesia if the procedure was performed in association with facial rejuvenation surgery. The fat grafts were harvested from the inner fat pocket of the upper eyelid through the upper blepharoplasty incision or through a direct small incision if there was no excess skin. The inner bag was localized; applying gentle pressure on the globe, the septum orbitale was incised and the fat graft was dissected in one piece. Careful hemostasis was performed and the incision was closed with a 6-0 subcuticular nylon suture.

The grafts were tailored to adapt to the groove (usually approximately 2 cm long, 0.4 cm wide, and 0.3 cm thick). They were then preserved in a moist sponge. Two stab incisions were made with a No. 15 blade, 5 mm from the cranial and caudal ends of the marked groove (Figure 1). A well-defined sharp dissection in the suborbicularis plane was performed with fine-pointed scissors (Figure 2). Hartmann ear forceps were introduced through the dissection, emerging from the opposite incision. The graft was grasped and the forceps removed, leaving the graft placed along the tunnel (Figure 3).

Immobilization of the fat graft is vital to its survival and to the precise correction of the depression. To achieve this, a piece of foam was applied along the length of the groove. It was fixed to the musculocutaneous plane and the graft with three circular stitches (Figure 4). This special dressing was maintained for four days. Thereafter, the patients could resume use of normal facial skincare and makeup. They were instructed to perform a gentle massage over the area of the graft twice daily for two weeks.

RESULTS

Thirty-three patients were treated in the manner described above. In one patient, because the fat harvested from the upper lid seemed to be scarce, we also used a thin strip of orbicularis oculi muscle, with good results. In 24 of 34 patients, results were rated excellent.
by the patients and all three authors. In the remaining 10 patients, the results were rated as good. Among the latter group, there were two cases of mild unilateral overcorrection, five cases of unilateral hypocorrection, and three cases of bilateral hypocorrection.

No morbidity in the donor area was observed and scarring was inconspicuous. No displacements or fat cysts occurred in relation to the grafts. In one patient, one graft was somewhat hard temporarily, but that issue resolved in one month with massage and good symmetry was maintained with the opposite side. Three representative clinical cases are shown in Figures 5, 6, and 7.

DISCUSSION

When the nasojugal groove is present without fat bags, there are presently three therapeutic options: the use of small, free fat grafts by the transcutaneous approach, filling with fat harvested by syringe, and the use of allo-
genic materials. The placement of small, free fat grafts by the transcutaneous approach (as Loeb\textsuperscript{b} described) is a valid option, but requires musculocutaneous section and dissection that may result in side effects caused by muscular denervation. It also produces greater postoperative edema, which could threaten the survival of the implant.

The amount of tissue necessary for the correction of the nasojugal groove is minimal (approximately 0.25 cm\textsuperscript{3}) but requires precise placement. Consequently, we suggest that lipofilling by syringe is not the best option, because the fat is always subject to resorption. It is also very difficult to calculate the exact amount necessary for the correction of the groove, particularly if the volume is very small. Even using a very small cannula, it is extremely difficult to control the exact placement of the fat. Furthermore, these grafts often develop small fibrotic or necrotic cysts that may be palpable and could even be visible, given the thinness of the musculocutaneous layer in this area. Iatrogenic lower lid deformity has been reported secondary to autogenous fat transfer in this manner.\textsuperscript{9}

In spite of numerous studies and research on new fill-
ingen materials,\textsuperscript{10,11} we believe that none of them have been presently proven to be totally safe and reliable. There is increasing concern about long-term immunologic reactions that produce local symptoms and are difficult to treat medically and surgically. Coiffman\textsuperscript{12} has recently described a new disease that he has termed “iatrogenic allogenosis”: “iatrogenic” because physicians injecting these substances have caused this disease and “allogenosis” because it is caused by allogenic (foreign) injectable substances. Although the 358 cases he described were related to the injection of liquid silicone, paraffin, and liquid petroleum jelly, we have observed some of the local reactions to which he refers (pain, prolonged erythema, pigmentations, or displacement) even with generally accepted substances like hydroxyapatite or hyaluronic acid.

Other autologous fillers include muscle or fascia.\textsuperscript{10} Muscle tissue is extremely sensitive to ischemia; therefore, these implants might become more easily fibrotic. On the other hand, in two cases in which we performed a frontotemporal lift using the temporoparietalis fascia as a graft, the results were not altogether satisfactory because of hardening/contraction of the graft that was noticeable on palpating the skin four to five months postoperatively.
Figure 6. A, C, Pretreatment views of a 45-year-old woman with lower skin laxity and severe nasojugal groove. B, D, Posttreatment views one year after upper blepharoplasty, lower skin resection, and tunneled fat graft.

Figure 7. A, C, Pretreatment views of a 51-year-old woman with severe upper eyelid skin laxity and tear trough deformity. B, D, Posttreatment views 16 months after upper skin resection and tunneled fat graft.
We believe that fat is still the best filling material and, furthermore, that palpebral fat is possibly the best fat to employ because of the high degree of cohesion provided by its dense fibrous network.\(^{13}\) This renders it easy to mold exactly into the desired shape and to insert in one piece, since it is resistant to breakage. An additional advantage is that it is the only body fat that does not increase in volume, even with huge ponderal gains. Even when no upper fat bags are clinically evident, it is possible to harvest these small fat grafts without surface sequelae. The total fat content of the orbit is approximately 18 to 20 cm\(^3\)\(^{14}\) and the required volume for these implants is some 0.3 to 0.5 cm\(^3\). Therefore, its harvest would not influence future depletion of the orbital fat, which is increasingly seen as an important sign of aging. However, in aged or extremely thin patients, it might be difficult to obtain a good graft in one piece.

**CONCLUSION**

The four most important variables with respect to the viability of fat grafts are size, surgical immobilization, low mobility of the receptor area, and good vascularization of the bed. The technique described here satisfies these classic and well-known variables, allows for the exact placing of the graft, and is also minimally traumatic. Our patients have been satisfied with their results. For these reasons, we believe that our technique as described in this article is an excellent option for the correction of the nasojugal groove.

**DISCLOSURES**

_The authors have no disclosures with respect to the contents of this article._

**REFERENCES**


Accepted for publication February 18, 2009.
Reprint requests: Luis de la Cruz, MD, Clinica La Luz, General Rodrigo, 8, Madrid 28003, Spain. E-mail: dr.delacruz@cirestetica.com.
Copyright © 2009 by The American Society for Aesthetic Plastic Surgery, Inc. 1090-820X/$36.00 doi:10.1016/j.asj.2009.02.015