

Application of Orbital Septum Fat Flap Stuffing to Correct Inferior Orbital Sulcus Deformities

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Summary: The inferior orbitopalpebral sulcus deformity is challenging during lower eyelid blepharoplasty. Plastic surgeons are currently addressing each case individually, depending on the patient's unique circumstances. Nevertheless, patients with large orbital grooves often complain that the inferior orbitopalpebral sulcus is not sufficiently improved. Altogether, 189 patients underwent transcutaneous blepharoplasty. According to their local anatomy, 98 underwent transcutaneous blepharoplasty surgery only, 59 had it combined with arcus marginalis release, and 32 had it combined with orbital septum fat flap stuffing. For the latter 32 patients, the orbital fat was trimmed and flipped to roll over the edge 10 mm from the infraorbital rim to form a base to repair the tear trough deformity and palpebromalar groove. Excessive dermatochalasis was removed, excrescent bulging fat was released, and the sulcus deformity was flattened using the orbital fat flap. The cosmetic results were satisfactory. Releasing the orbital septal fat helped restructure the deformity. The lower eyelid bags and lower orbital sulcus deformities were well corrected, allowing recovery with a convex-type facial contour. Using an orbital fat flap to treat a tear trough deformity and palpebromalar groove is effective and safe. Careful performances by surgeons can avoid serious complications. This operation satisfies both patients and surgeons. (*Plast Reconstr Surg Glob Open* 2019;7:e2561; doi: 10.1097/GOX.0000000000002561; Published online 31 December 2019.)

INTRODUCTION

Lower eyelid blepharoplasty is widely used in cosmetic surgery. In older patients, however, an orbital groove with obvious adipose prominence and bulging is often seen.¹ In such cases, plastic and cosmetic surgeons strive to correct the tear trough and palpebromalar groove simultaneously while avoiding complications such as lower eyelid retraction. A variety of techniques have been proposed to address this correction. The differences among these techniques lie mainly in the different surgical approaches and whether to remove orbital fat.²⁻⁴ Particularly, the arcus marginalis release proposed by Hamra is a highly effective technique for improving patient satisfaction, and we have achieved good results with it.⁵ Nevertheless, some patients with Barton's grade

II or III tear trough deformity, classified according to the patient's anatomical appearance,⁶ were not satisfied with the improved inferior orbitopalpebral sulcus after lower blepharoplasty surgery. Therefore, we considered how to meet the needs of this group of patients who required treatment for their tear trough and palpebromalar groove deformity. This paper describes a series of patients treated within our practice.

PATIENTS AND METHODS

Case Series

Between October 2015 and November 2017, we enrolled 189 patients in this study (31 men, 158 women; ages 42–70 years, mean 47.8 ± 9.8 years). Patients were classified according to their tear by Barton's grading system. **Table 1** shows the baseline preoperative morphologic characteristics. Each patient was treated with transcutaneous blepharoplasty. Some required additional arcus marginalis release (n = 59) or orbital septum fat flap stuffing (n = 32). **Table 1** shows the variations in operative management. Overall, the mean follow-up was 6 months (range 3–12 months). All patients gave informed consent before treatment.

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Received for publication December 28, 2018; accepted October 16, 2019.

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DOI: 10.1097/GOX.0000000000002561

Disclosure: The authors have no financial interest to declare in relation to the content of this article.

Table 1. Baseline Preoperative Morphologic Characteristics/Variations in Operative Management and Satisfaction

Anatomic Analysis	No. Patients	Operation Method	No. Patients	Customer Satisfaction
Barton's grade 0	43 (23%)	Only lower eyelid blepharoplasty	98 (52%)	86 (91%)
Barton's grade I	72 (38%)	Only lower eyelid blepharoplasty		
Barton's grade II	53 (28%)	Combine arcus marginalis release	59 (31%)	49 (88%)
Barton's grade III	21 (11%)	Combine orbital septum fat flap stuffing	32 (17%)	25 (87%)

Surgical Technique/Intervention (Combined with Orbital Septum Fat Flap Stuffing)

The technique starts with the patient sitting, looking straight ahead. The surgeon marks the area of bulging fat of the lower eyelid and that of the groove structure. Then, with the patient lying supine, the surgeon designs an incision 1.5mm from the base of the eyelash that is parallel to the lower eyelid. The incision line starts at the inner canthus and terminates at the outer canthus. The patient looks upward in the direction of the head, and the surgeon uses smooth forceps to measure the lower eyelid skin. The second incision line is designed according to the amount of skin to be removed.

For anesthesia, local anesthetic (1% lidocaine with 1:200,000 epinephrine) was infiltrated along the incision line combined with an infraorbital nerve block. About 5 minutes after administration, the skin is incised, and the excessive skin and orbicularis muscle are removed along the marked line. Blunt and sharp dissection is conducted between the orbicularis oculi muscle and the orbital septum. Dissection is then performed along the surface of the periosteum, which is about 10mm inferior to the infraorbital rim. The infraorbital neurovascular bundle (about 6–10mm from the orbital rim) should be especially protected. The orbital septum is then exposed and cut open at the top of the adipose prominence to trim it and form a septal orbital fat flap whose stem is on the top so it can be easily flipped upside down (Fig. 1). The orbital septal fat flap is then transferred to form the base of the tear trough deformity and palpebromalar groove. After these structures are flattened, excess fat is removed. After adjusting the fat into an appropriate position, it is

sutured and anchored to the suborbital periosteum. Note that the suborbital nerve bundle should be avoided when fixing the fat flap. The skin is then returned to its normal position and sutured with 7-0 nylon thread so the lower eyelid skin has returned to a level position.

RESULTS

During the approximately 2-year study period, 189 patients underwent lower eyelid transcutaneous blepharoplasty with or without associated further repairs. The patients were followed up postoperatively according to protocol by clinic or telephone. Ten patients were excluded from the study because they did not meet the minimum 6-week follow-up criterion, leaving 179 patients for the final analysis.

Eight people of follow-up patients describe the complications, including the lower eyelid depression, the lower eyelid ectropion, epiphora, and numbness (the upper lip and ala nasi). Numbness is a unique complication in the method of combine orbital septum fat flap stuffing. All complications eventually subsided, as described by the patients. In all, 89% patients were satisfied. Those who were dissatisfied complained about complications and the existence of a lower orbital sulcus. Table 1 shows the satisfaction rates associated with the 3 operative variations (Fig. 2).

DISCUSSION

Lower eyelid blepharoplasty to treat a tear trough deformity and palpebromalar groove can be challenging. The debate about the procedure focuses mostly on whether orbital septum fat is removed. Some believe that excessive fat is the main cause of the deformity and so should be removed. Others believe that relaxation of the lower eyelid support structure is the main cause, so the orbital fat should not be removed.^{6,7} Hence, the prevailing view is that the various types of baggy deformity of the lower eyelid should be distinguished, and individualized surgical procedures developed, to optimize the results.⁸ For older patients, the condition requiring lower blepharoplasty is often accompanied by a combination of a significantly lower orbital sulcus. In such cases, the preoperative evaluation is highly important to the results of the surgery undertaken.^{9,10} The presence of both an inner tear trough and a lateral palpebromalar groove makes people look old and tired. When we undertake orbital rejuvenation, we should not only deal with the fat in the bulging lower eyelid but also fill the hollow groove at the base to achieve satisfactory results. There are various methods, such as that of Hamra, who designed a way to release orbital fat, lift the orbicularis oculi muscle,

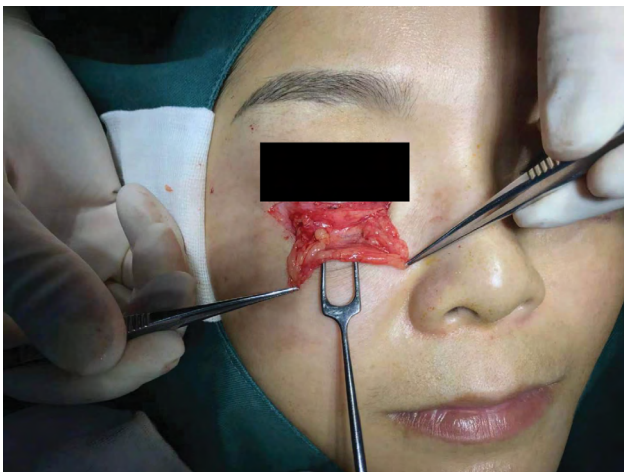


Fig. 1. We cut open the adipose prominence to trim it and form a septum orbitale fat flap whose stem is on the top.



Fig. 2. A 49-year-old woman underwent transcutaneous orbital septal fat flap filling of the orbitopalpebral sulcus. Preoperative (A) and postoperative (B) right oblique views.

and eliminate flaccid and excessive skin.¹¹ Miranda and Codner used small fat particles (2–3 mm) to fill the sub-orbital groove.¹² Each of these techniques has achieved good effects as well as the goal of rejuvenating the orbit. The principles of the design are to eliminate the superfluous, supplement the insufficient, draw material from nearby, and use it reasonably.^{13,14}

We thus release the orbital septal fat and fill the arcuate edge to meet the needs of most patients who wish for periorbital rejuvenation. Some patients (Barton's grades II and III), however, have large orbital grooves, and the lower boundary of the tear trough and the palpebromalar groove is >10 mm from the orbit. In such cases, Hamra's arch edge-filling method could not completely address the deformity of the lower orbital sulcus. Here, we extended the Hamra operation to fully reverse the deformity of the lower orbital sulcus. We increased the dissection range of the suborbital region to >10 mm from the orbital edge so all the soft tissue of the lower orbital sulcus could be raised and the manicured fat flap could be turned over and used to fill the base of the groove. We cut the orbital septum closer to the palpebral margin so orbital septal fat is released into the fat flap to form a larger diameter to meet the need for the longer length of the flap (Fig. 3). When we filled the fat flap, we divided it into 3 parts to avoid the infraorbital foramen (about 6–10 mm away from the orbit) and to avoid damaging vascular nerve bundles in the area.¹⁵ This method also disallows binding of the orbicularis oculi muscle and the lacrimal ligament in the eyes. This synergistic effect further improves orbital relaxation and the aging structure, making the effects of periorbital rejuvenation more obvious.

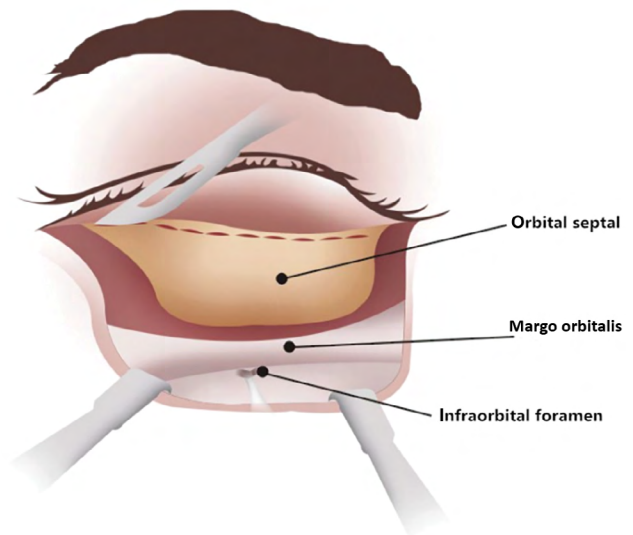


Fig. 3. The dissection range of the suborbital region was increased to >10 mm from the orbital edge, and the orbital septum was cut closer to the palpebral margin.

CONCLUSIONS

Full dissection of the orbital sulcus structure and reverse filling of the orbital septum fat flap were utilized to release orbital septal fat and restructure it. Thus, wider tear troughs and palpebromalar grooves (Barton's grades II and III), lower eyelid bags, and lower orbital sulcus deformities can be well corrected with full awareness of the indications and careful surgery. Single

convex-type face contours can thus be recovered. This technique achieves excellent cosmetic results and is safe and reliable.

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ACKNOWLEDGMENT

We thank Nancy Schatken, BS, MT(ASCP), from Liwen Bianji, Edanz Group China (www.liwenbianji.cn/ac), for editing the English text of a draft of this article.

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