

# Correction of Sunken Eyelid with Orbicularis Oculi Muscle Flap in Aging Blepharoplasty

Ying-Chun Liu, Wen-Chen Huang, Wen-teng Yao, Yu-Fan Chen,  
Kwang-Yi Tung, Chia-Meng Yu

Mackay Memorial Hospital, Plastic surgery department, Taipei Taiwan

## Background:

Sunken eyelid is a commonly seen aging-related problem in Oriental populations. Several methods of sunken eyelid correction have been introduced, including local fat transposition, distant fat graft transfer, synthetic material injection, etc.

## Materials and Method:

In this study, we introduces a new method for sunken eyelid correction, by designing an orbicularis oculi muscle flap to fill the sunken space.

## Result:

A total of 15 cases were recruited between January 2015 and February 2018. Of these, 13 were bilateral eyes and 2 were unilateral, for a total of 28 eyes. In the total 28 eyes, 21 eyes is classified as grade 2 (75%) and 7 eyes is classified as grade 1 (25%). By this method, there are 25 sunken eyes downgraded in severity in final result (89%). All patients had satisfactory outcomes, with no postoperative complications.

## Conclusion:

The orbicularis oculi muscle flap is easy to harvest, generally stable, and shows less resorption than a fat graft. It is a simple and predictable method for correction of sunken upper eyelids. (J Taiwan Soc of Plast Surg 2018;27:273~280)

**Key words:** sunken eyelid, superior sulcus deformity, upper eyelid hollowing, sunken superior sulcus, orbicularis oculi muscle flap, blepharoplasty

## Introduction

Sunken eyelid, a common seen problem in the elderly, is also called superior sulcus deformity, upper eyelid hollowing, or sunken superior sulcus. The causes of

sunken eyelid are 1. Congenital, 2. Traumatic, 3. Iatrogenic (excessive fat removal due to previous blepharoplasty), and 4. Senile. With aging, the supporting structure – Lockwood's ligament – weakens<sup>1-2</sup>, and a rouleau phenomenon develops. The lower septal fat bulges and the

upper septal fat moves posteriorly, causing sunken eyelid formation. If bony resorption is also present, the sunken appearance will worsen.

Several different methods for correction of sunken eyelid have been proposed. Autologous fat tissue transfer<sup>3</sup>, local fat transposition<sup>4-6</sup>, and synthetic material injection<sup>7</sup> are the primary techniques. This article introduces a new method for sunken eyelid correction, by designing an orbicularis oculi muscle flap to fill the sunken space.

## Materials and Method

The sunken part of the upper eyelid is marked first. Excessive skin over the upper eyelid is marked and excised in the usual fashion. The orbicularis oculi muscle is then exposed. Instead of removal, a medial based muscle flap is designed that will fill the sunken area later. The underlying septum is opened and the muscle flap is turned into the septal space just beneath the sunken area. The muscle flap is then anchored with stay sutures. The correction of sunken eyelid is complete and further procedures for a double eyelid follow, if needed.

A total of 15 cases were recruited between January 2015 and February 2018. Of these, 13 were bilateral eyes and 2 were unilateral, for a total of 28 eyes. The mean follow up time is 8 months (6 months to 12 months).

The photos were taken pre- and post-operatively and the grade of sunken was recorded. Grade 1 is defined as the sunken is present but no prominent contour of the orbital bone. Grade 2 is defined as the sunken with the visible bony orbital rim<sup>6</sup>.

## Result

In the total 28 eyes, 21 eyes is classified as grade 2(75%) and 7 eyes is classified as grade 1(25%). All patients in grade 2 group are improved to grade 1 postoperatively. In the grade 1 group, 4 eyes show almost no sunken postoperatively. 3 patients has improvement but

still mildly sunken. There are 25 sunken eyes downgraded in severity in final result. (89%)

The mean age of the patient in our series is 55 years. (Range: 42-62) All of the patient were corrected with an o.o.m. flap and double eyelid blepharoplasty. All patients had satisfactory outcomes with no postoperative complications, and there is no revision surgery. The photo is compared pre and post-operatively (6 months).

### Case 1

Fig. 2 A 47-year-old woman with bilateral sunken eyelid following upper blepharoplasty and orbicularis muscle flap correction. (Grade 2 → Grade 1)

Fig. 3 Intraoperative photo. The orbicularis muscle flap is harvested (left) and transposed into the septal area just beneath the sunken part (right).

### Case 2

Fig. 4 A 62-year-old woman with bilateral sunken eyelid following upper blepharoplasty and orbicularis muscle flap correction. (Grade 2 → Grade 1)

### Case 3

Fig. 5 A 47-year-old woman with left sunken eyelid underwent left orbicularis oculi muscle flap correction and bilateral blepharoplasty. (Grade 1 → nearly no sunken)

### Case 4

Fig. 6 A 57-year-old woman with left sunken eyelid underwent left orbicularis oculi muscle flap correction and bilateral blepharoplasty. (Grade 1 → Grade 1)

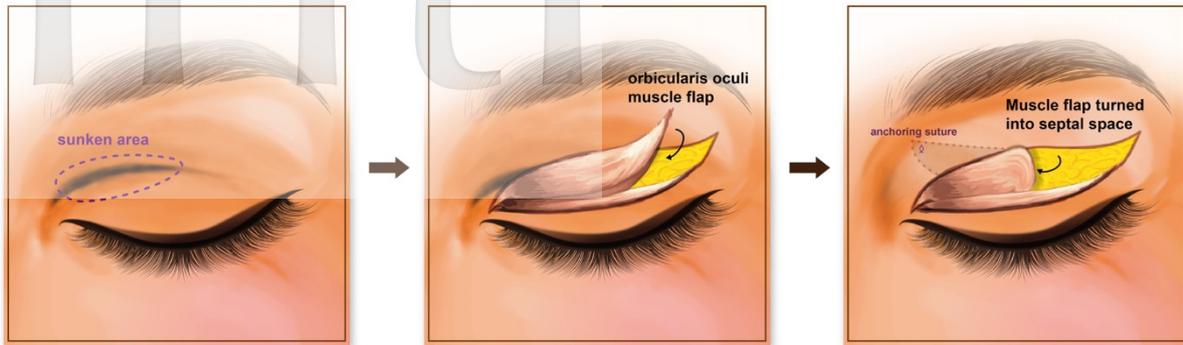


Fig. 1. Illustration of the orbicularis oculi muscle flap correcting the sunken eyelid. We marked the sunken area first (left), then exposed the o.o. muscle. The o.o.m. flap is elevated (middle) then turned into the septal space. Anchoring suture is done at the tip to fix the flap and the septum. (right)



Preoperative



Postoperative (6 months)

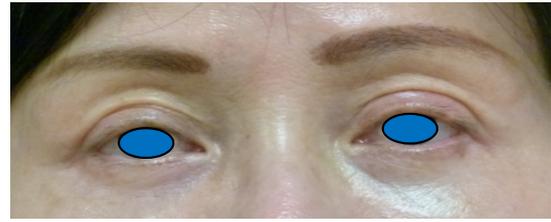
Fig. 2. A 47-year-old woman with bilateral sunken eyelid following upper blepharoplasty and orbicularis muscle flap correction. (Grade 2 → Grade 1)



Fig. 3. Intraoperative photo. The orbicularis muscle flap is harvested (left) and transposed into the septal area just beneath the sunken part (right).

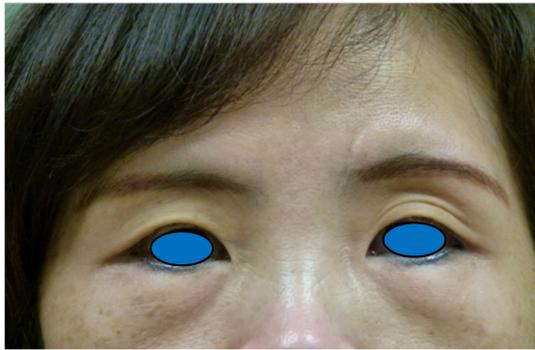


Preoperative

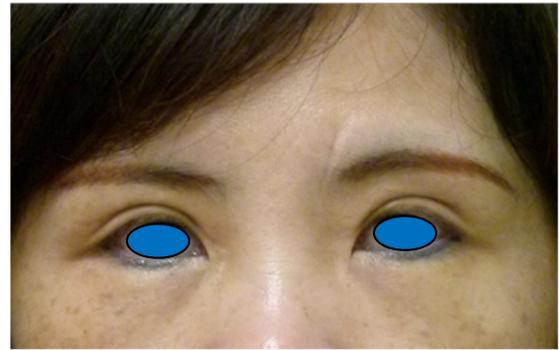


Postoperative (6 months)

Fig. 4. A 62-year-old woman with bilateral sunken eyelid following upper blepharoplasty and orbicularis muscle flap correction. (Grade 2 → Grade 1)



Preoperative

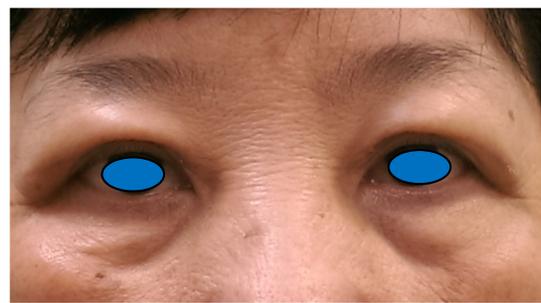


Postoperative (6 months)

Fig. 5. A 47-year-old woman with left sunken eyelid underwent left orbicularis oculi muscle flap correction and bilateral blepharoplasty. (Grade 1 → nearly no sunken)



Preoperative



Postoperative (6 months)

Fig. 6. A 57-year-old woman with left sunken eyelid underwent left orbicularis oculi muscle flap correction and bilateral blepharoplasty. (Grade 1 → Grade 1)

**Table 1. Demographic data**

		Case numbers
Age	40-50 y/o	6
	50-60 y/o	3
	Over 60 y/o	6
Sex	M	1
	F	14
Unilateral		2
Bilateral		13

**Table 2. Options for sunken eyelid correction**

Type	Options
Autologous distant tissue grafting	Fat graft
	Dermofat grafting
	Fascia fat grafting
Autologous local tissue reposition	Orbital fat reposition
	Periosteal flap
Allogeneic graft	Acellular dermal allograft
Filler	Hyaluronic acid

## Discussion

The eyelid and periorbital area are important in expressing facial features, and can convey mood, spirit, and age. Hollowing and skeletonized appearance in the upper face emphasizes senile changes. For this reason, eyelid and periorbital aesthetic surgery is increasingly popular and many plastic surgeons have reported new surgical methods.

In recent decades, the main treatments for sunken eyelid can be categorized into 3 major types: autologous distant tissue transfer, local tissue reposition, and filler injection/other allogeneic graft (Table 2)<sup>8</sup>.

Fat grafting was first introduced by Neuber in 1893<sup>9</sup>. The technique of fat grafting has gradually been improved and modified. The main disadvantages of fat grafting include: donor site morbidity, fat resorption, risk of lumpiness, and even blindness. Some surgeons use overcorrection to overcome fat resorption, but resulting severe lumpiness and ptosis have been reported<sup>10</sup>. Therefore, overcorrection should be carefully managed. In cases of severe sunken eyelid, some authors advocated using a dermofat graft for initial treatment due to the relatively low resorption rate (10%-20%)<sup>6</sup>, compared to that of a fat graft (40%)<sup>9</sup>.

In the aging process, loosening of the supporting structure – Lockwood's ligament – and bony resorption cause unbalanced changes in the orbital area. Sozer et al<sup>4</sup>. first advocated the use of fat pad transposition to increase lateral fullness in upper blepharoplasty. Lee et al<sup>6</sup>. and Jeon<sup>5</sup> et al. also reported using orbital fat transposition to increase medial fullness. With inward compression of the lower eyelid, a sunken upper eyelid will appear improved if there is enough fat tissue inside the orbit. This is a simple way to determine the adequacy of fat tissue<sup>11</sup>.

Hyaluronic acid injection is also advocated in some reports<sup>7,12-14</sup>, as it provides a convenient way to correct the sunken eyelid, with a good outcome. As the high cost and short duration of improvement are major disadvantages, injection can be considered an adjuvant procedure for an unsatisfactory appearance.

When upper eyelid blepharoplasty is performed in aging patients with baggy eyelids, excess skin is often

excised and the orbicularis oculi is trimmed for a smoother contour. Our procedure uses an orbicularis oculi muscle flap as a filler, by turning the flap into the septal area to correct the sunken eyelid. This method has several advantages. First, it uses a simple additional step to fully utilize an unnecessary part of the orbicularis oculi. Second, it is time-saving because additional fat harvesting is not performed. Third, due to the lower resorption rate, the final result is more predictable. In our experience, this method is suitable for elderly patients, and enables simultaneous correction of sunken eyelids and lateral hooding. The double eyelid appears more pleasant and has a full texture. Moreover, in some patients with eyelid asymmetry, the method can be performed unilaterally and is seen as an optional procedure to create an appearance of symmetry.

However, as with fat tissue repositioning, this method cannot correct the severely sunken eyelid. A combination of fat reposition or fat grafting with filler injection is then considered. In our study, all 15 patients reported a satisfactory outcome without fat grafting or other adjuvant procedure.

## Conclusion

The orbicularis oculi muscle flap is easy to harvest, generally stable, and shows less resorption than a fat graft. It is a simple and predictable method for correction of sunken upper eyelids.

## Reference

1. Moon HS, Ahn B, Lee JH et al. Rejuvenation of the deep superior sulcus in the eyelid. *J Cosmet Dermatol.* 2016; Dec;15(4):458-468.
2. Kang H, Takahashi Y, Nakano T et al. Medial canthal support structures: the medial retinaculum: a review. *Ann Plast Surg.* 2015;74:508-14.
3. Lin TM, Lin TY, Huang YH et al. Fat grafting for recontouring sunken upper eyelids with multiple folds in Asians—novel mechanism for neof ormation of double eyelid crease. *Ann Plast Surg.* 2016;76:371-5.
4. Sozer SO, Agullo FJ, Palladino H et al. Pedicled fat flap to

- increase lateral fullness in upper blepharoplasty. *Aesthet Surg J.* 2010;30:161-5.
5. Jeon MS, Jung GY, Lee DL et al. Correction of sunken upper eyelids by anchoring the central fat pad to the medial fat pad during upper blepharoplasty. *Arch Plast Surg.* 2015;42:469-74.
  6. Lee W, Kwon SB, Oh SK et al. Correction of sunken upper eyelid with orbital fat transposition flap and dermofat graft. *J Plast Reconstr Aesthet Surg.* 2017;70:1768-75.
  7. Leyngold IM, Berbos ZJ, McCann JD et al. Use of hyaluronic acid gel in the treatment of lagophthalmos in sunken superior sulcus syndrome. *Ophthalmic Plast Reconstr Surg.* 2014;30:175-9.
  8. Lee Y, Kwon S, Hwang K. Correction of sunken and/or multiply folded upper eyelid by fascia-fat graft. *Plast Reconstr Surg.* 2001;107:15-9.
  9. Lin TM, Lin TY, Chou CK et al. Application of microautologous fat transplantation in the correction of sunken upper eyelid. *Plast Reconstr Surg Glob Open.* 2014;2:e259.
  10. Li XQ, Wang TL, Wang JQ. Ptosis: an underestimated complication after autologous fat injection into the upper eyelid. *Aesthet Surg J.* 2015;35: NP147-53.
  11. Chen CC, Chen SN, Huang CL. Correction of Sunken Upper-Eyelid Deformity in Young Asians by Minimally-Invasive Double-Eyelid Procedure and Simultaneous Orbital Fat Pad Repositioning: A One-Year Follow-up Study of 250 Cases. *Aesthet Surg J.* 2015. 35(4): p. 359-66.
  12. Morley AM, Taban M, Malhotra R et al. Use of hyaluronic acid gel for upper eyelid filling and contouring. *Ophthalmic Plast Reconstr Surg.* 2009;25:440-4.
  13. Choi HS, Whipple KM, Oh SR et al. Modifying the upper eyelid crease in Asian patients with hyaluronic acid fillers. *Plast Reconstr Surg.* 2011;127:844-9.
  14. Liew S, Nguyen DQ. Nonsurgical volumetric upper periorbital rejuvenation: a plastic surgeon's perspective. *Aesthetic Plast Surg.* 2011;35:319-25.

---

Reprints request from: Wen-Chen Huang, M.D.  
Department of Plastic and Reconstructive Surgery, Mackay Memorial Hospital, Taiwan  
Address: No. 92, Sec. 2, Zhongshan N. Rd., Taipei City 10449, Taiwan  
Tel: 886-2-2543-3535  
Fax: 886-2-2543-3642  
E-mail: huang42@ms2.mmh.org.tw

## 利用眼輪匝肌皮瓣矯正眼窩凹陷

劉映君 黃文成 姚文騰 陳昱帆 董光義 游家孟

### 背景：

眼窩凹陷常見於東方老年族群，目前已經有許多眼窩凹陷的治療方法。包括局部脂肪轉位、脂肪移植、填充物注射等。

### 方法：

利用設計眼輪匝肌皮瓣來填充眼窩凹陷部位。

### 結果：

自 2015 年 1 月至 2018 年 8 月，一共有 15 位病人接受此手術矯正。其中有 13 位病患為雙側，2 位病患為單側，一共 28 隻眼睛。其中有 21 隻眼睛為 grade 2 (75%)，7 隻眼睛為 grade 1 (25%) 術後合計有 25 隻眼睛有明顯的改善 (89%)。所有病人都滿意手術的成果並且沒有手術相關併發症。

### 結論：

眼輪匝肌皮瓣分離步驟容易，穩定且比脂肪較不易吸收。可以此簡單且可預測的矯正方式將眼窩凹陷矯正之。