

# Canthal V-plasty for Floppy Eyelid Surgery

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**Summary:** The purpose of this article is to present a modified approach to the reconstruction of the upper and lower eyelids in floppy eyelid syndrome. A retrospective chart review was performed on all floppy eyelid patients who underwent simultaneous tightening of the upper and lower eyelid with a lateral tarsal strip, using a V-shaped incision in the lateral canthus, at University of Tennessee Hamilton Eye Institute from 2011 to 2012. Preoperative symptoms, surgical outcomes, complication rates, and postoperative symptoms were recorded. Nine eyes of 7 patients who underwent surgical correction for symptomatic floppy eyelids were included. All patients noted improvement in symptoms postoperatively, after reduction in the laxity of the upper and lower eyelid. Postoperative complications included buried lashes in the lateral canthus in 1 eye and a pyogenic granuloma in the lateral canthus of 1 eye. An excellent cosmetic outcome was noted in 78% (7/9) of eyes. No patients reported dissatisfaction nor required secondary surgical correction. The lateral canthal “V” incision provides an additional approach in the successful management of floppy eyelid syndrome involving the upper and lower eyelids. The design of the incision allows for excellent exposure of the lateral canthus for shortening of the eyelids with tarsal strip fixation, and it preserves the lateral canthal skin and canthus architecture. Further, the “V” incision is easily continued into the eyelid crease for blepharoplasty and ptosis repair when necessary. (*Plast Reconstr Surg Glob Open* 2019;7:e2464; doi: [10.1097/GOX.0000000000002464](https://doi.org/10.1097/GOX.0000000000002464); Published online 29 October 2019.)

## INTRODUCTION

Floppy eyelid syndrome (FES) was first described in 1981 as floppy upper eyelids, nocturnal upper eyelid eversion, and papillary conjunctivitis.<sup>1</sup> Additional features included lash ptosis, blepharoptosis, lower eyelid laxity, and keratoconus.<sup>2-8</sup>

The first reported surgical approaches to FES were the upper lid tarsal strip and upper lid wedge resection.<sup>9,10</sup> Additional procedures, including medial tarsal strip, medial upper eyelid shortening, back-tapered lateral wedge resection, upper/lower tarsal strip-periosteal strip fixation, lateral canthal/medial canthal tendon plication, and upper eyelid reinforcement with auricular conchal cartilage, have been reported.<sup>7-14</sup> With the exception of the upper and lower eyelid tarsal strip-periosteal strip procedure, the above-mentioned procedures corrected only

upper eyelid laxity. A second incision was required if lower eyelid laxity was addressed.

The purpose of this paper is to report a novel technique for treating FES with a simultaneous upper and lower eyelid tarsal strip, utilizing a lateral canthal “V” incision centered over the lateral canthus.

## PATIENTS AND METHODS

A retrospective review of all patients with a diagnosis of FES at The Hamilton Eye Institute from 2011 to 2012 was performed. All patients who underwent simultaneous tightening of the upper and lower eyelids with a lateral tarsal strip, using a lateral canthal “V” incision were identified. Patient demographics, amount of eyelid shortening, necessary adjuvant procedures, symptom resolution, patient satisfaction, complications, and length of follow-up were recorded. Data were summarized by mean ( $\pm$ SD) or by frequency (%).

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## SURGICAL TECHNIQUE

The lateral canthal incision was marked as seen in **figure A (Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease. In Supplemental Digital Content 1B, the lateral canthotomy and cantholysis of the upper and lower eyelids is seen. Supplemental Digital Content 1C and D demonstrates the shortening of the upper lid and creation of the tarsal strip. Supplemental Digital Content 1E–G demonstrates the anchoring of the upper and lower tarsal strips. In Supplemental Digital Content 1H, the incision is closed, showing the preservation of the lateral canthal architecture, <http://links.lww.com/PRSGO/B231>). The V-shaped incision was centered over the lateral canthus so that the point of the “V” abutted the lateral canthal angle. The angle of the “V” measured 45 degrees, with each arm of the “V” extending superiorly and inferiorly for 5–7 mm. The superior limb of the incision could be extended medially into the lid crease to allow for simultaneous ptosis repair or blepharoplasty.

The lateral canthus was anesthetized with 2% lidocaine with epinephrine. The skin was incised and a skin/orbicularis flap was lifted. A canthotomy/cantholysis was performed (**see figure A, Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease). Lateral tarsal strips were fashioned (**see figure B, Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease). The lengths of the tarsal strips were shortened laterally to allow for appropriate eyelid tension (**see figure C and D, Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease). The lateral tarsal strips were anchored to the periosteum of the internal surface of the lateral orbital rim with a 5-0 nylon inferiorly and a 5-0 polyglactin 910 superiorly, taking care to place the new lateral canthus approximately 1 millimeter superior to the medial canthus (**see figure E–G, Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease).

A 6-0 plain gut was placed to reform the lateral canthal angle. The anterior lamella was shortened laterally, as needed, to oppose the lateral canthal flap without redundancy. The lateral canthal flap was sutured into place with interrupted 6-0 plain gut (**see figure H, Supplemental Digital Content 1**, which demonstrates the lateral canthal “V” incision, with the option to carry superiorly into the lid crease).

## RESULTS

A total of 9 eyes of 7 patients underwent surgical correction for FES from 2011 to 2012. There were 6 men and 1 woman with mean age of 65 years ( $\pm 8.2$ ). All patients diagnosed with FES were referred for OSA evaluation by a pulmonologist. Five (55%) eyes of 3 patients had previous eyelid surgery by outside physicians. These

patients denied resolution of symptoms after their initial surgeries.

The chief complaints upon presentation to our institution included tearing ( $n = 5$ ), chronic irritation ( $n = 2$ ), and nocturnal eyelid eversion ( $n = 2$ ). All eyes were found to have laxity of the upper and lower eyelids (**see figure, Supplemental Digital Content 2**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation. Note the appearance of a healed lateral canthus after floppy eyelid surgery repair utilizing the lateral canthal “V” incision, <http://links.lww.com/PRSGO/B232>) (**see figure, Supplemental Digital Content 3**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation, <http://links.lww.com/PRSGO/B233>) (**see figure, Supplemental Digital Content 4**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation, <http://links.lww.com/PRSGO/B234>).

Four eyes had lash ptosis, and 4 eyes had easy eversion of the upper eyelid. All affected eyes had palpebral conjunctival injection.

All eyelids underwent the standard procedure, as detailed above. Two eyes of one patient had supplemental medial canthal tendon tightening for medial canthal laxity. The mean upper and lower eyelid resection was 9.8 mm ( $\pm 3.4$  mm) and 6.8 mm ( $\pm 1.3$  mm), respectively. Mean follow-up was 17 months ( $\pm 8.7$ , range 6–24 months).

All patients reported resolution of their symptoms, with 7 eyes of 7 patients noting resolution of symptoms during their early postoperative period. Two eyes with primary complaints of irritation preoperatively noted gradual improvement over the next 4 months postsurgery. There was no recurrence of nocturnal eyelid eversion. All patients had significant reduction in the laxity of the eyelids (**see figure, Supplemental Digital Content 2**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation. Note the appearance of a healed lateral canthus after floppy eyelid surgery repair utilizing the lateral canthal “V” incision, <http://links.lww.com/PRSGO/B232>) (**see figure, Supplemental Digital Content 3**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation, <http://links.lww.com/PRSGO/B233>) (**see figure, Supplemental Digital Content 4**, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation, <http://links.lww.com/PRSGO/B234>). Complications included a pyogenic granuloma of 1 eye and buried lashes in another. Both were addressed as minor procedures.

## DISCUSSION

Incisions are typically arranged to maximize exposure while minimizing function-limiting scar formation or poor cosmesis. The lateral canthus is one of the few areas where wrinkle lines do not correspond with resting skin tension lines but are related to the sphincteric function of the orbicularis muscle.<sup>15,16</sup> These wrinkle lines guided our use of the “V” incision in the lateral canthus which was helpful for several reasons. First, the elevation of the flap allowed for increased exposure to the lateral canthus when shortening the eyelids and anchoring both upper and lower tarsal strips. Second, it provided a platform to address the anterior lamellar redundancy of the upper and lower eyelids after tarsal strip creation. When using the lateral canthal “V” incision, the anterior lamellae were easily overlapped superior and inferiorly to determine redundancy. When necessary, the incision was easily continued into the upper eyelid crease to perform a modified blepharoplasty and/or ptosis repair. Last, the design of the V-plasty preserved the natural skin and contour of the lateral canthus while maintaining the incision sites in the natural wrinkle lines of the lateral canthus (see figure C, Supplemental Digital Content 2, which demonstrates the preoperative and postoperative appearance of a patient after undergoing simultaneous repair of severely lax upper and lower eyelids with the lateral canthal “V” incision and tarsal strip fixation. Note the appearance of a healed lateral canthus after floppy eyelid surgery repair utilizing the lateral canthal “V” incision, <http://links.lww.com/PRSGO/B232>).

Previous FES repairs focused on the correction of upper eyelid laxity primarily, and many used variations of a wedge resection to shorten the upper eyelid.<sup>10–12</sup> Simultaneous tightening of the lower eyelid required a second incision site. For this reason, the use of lateral tarsal strips for the shortening of upper and lower eyelids became the senior author’s procedure of choice in FES.

Our study is limited by its retrospective design and small sample size. More recent results were excluded, as the senior author and principal surgeon (J.C.F.) has since retired.

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