

# THE DEHISCENT HUGHES FLAP: OUTCOMES AND IMPLICATIONS

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## ABSTRACT

**Purpose:** The modified Hughes procedure is used to reconstruct full-thickness lower eyelid defects. A tarsoconjunctival flap from the upper eyelid replaces the posterior lamella, whereas a skin graft, a skin flap, or a skin-muscle flap restores the anterior lamella. The conjunctival pedicle from the upper eyelid is divided after vascularization of the reconstructed lower eyelid is judged to be adequate (traditionally, at least 3 weeks postoperatively). This study reviews the outcomes of patients in whom the conjunctival flap prematurely dehisced.

**Methods:** Eight patients were identified during a 15-year interval. The posterior lamellar defects ranged in size from 13 to 30 mm horizontally and 5 to 8 mm vertically. The average age at the time of eyelid reconstruction was 72 years (range, 60-84 years). Flap dehiscence, resulting in each case from accidental trauma, occurred between 1 and 11 days postoperatively. Surgical repair of the dehiscence was unsuccessfully attempted in one case; otherwise, the eyelids were permitted to heal spontaneously with the application of erythromycin ophthalmic ointment as the sole therapy.

**Results:** Although the result was satisfactory in each case, one patient, who had dry eyes from Sjögren's syndrome, required secondary surgery to treat mild lagophthalmos and lower eyelid retraction. Follow-up ranged from 3 to 122 months (median, 6.5 months).

**Conclusions:** The ultimate functional and aesthetic outcomes after premature, traumatic dehiscence of a Hughes flap were surprisingly good, suggesting that elective division of the conjunctival pedicle in routine cases can be performed relatively soon after the primary reconstructive procedure.

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## INTRODUCTION

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The Hughes procedure is a commonly used technique to reconstruct full-thickness lower eyelid defects.<sup>1-4</sup> A tarsoconjunctival flap advanced from the ipsilateral upper eyelid replaces the posterior lamella, whereas a skin graft, a skin flap, or a skin-muscle flap restores the anterior lamella. The conjunctival pedicle from the upper eyelid is divided after vascularization of the reconstructed lower eyelid is judged to be adequate (traditionally, at least 3 weeks postoperatively).<sup>5</sup> This study reviews the outcomes of patients in whom the conjunctival flap prematurely dehisced.

## METHODS

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All patients who had undergone a modified Hughes procedure by the physician-author and whose conjunctival flap had prematurely separated were identified from a computerized database. After institutional review board approval was obtained, pertinent medical records were reviewed.

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## RESULTS

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Premature flap dehiscence occurred in 8 of approximately 100 patients who underwent a modified Hughes procedure during the 15-year interval January 1987 through December 2001. Clinical data are summarized in Table I. The average age at the time of eyelid reconstruction was 72 years (range, 60-84 years). The posterior lamellar defects ranged in size from 13 to 30 mm horizontally and 5 to 8 mm vertically. In all cases, Mueller muscle was dissected free from the conjunctival pedicle and was allowed to retract. The anterior lamella was reconstituted with a skin graft in three patients and a skin advancement flap in five patients. A bipedicle orbicularis flap was used to nourish the underlying tarsoconjunctival flap and the overlying skin graft or flap in two patients.

Flap dehiscence, resulting in each case from accidental trauma, occurred between 1 and 11 days postoperatively in seven of the eight patients. One patient (case 6) was unable to identify the exact day on which the flap separated. The size of the dehiscence ranged from approximately 25% of the flap in one patient to 100% in four patients. Surgical repair of the dehiscence was unsuccessfully attempted in one patient (case 4); otherwise, the eyelids were permitted

TABLE 1: CLINICAL DATA FOR EIGHT PATIENTS WITH PREMATURE FLAP DEHISCENCE FOLLOWING MODIFIED HUGHES PROCEDURE

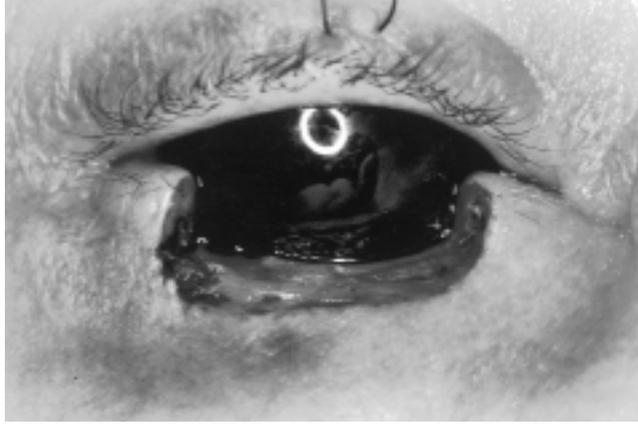
CASE	AGE AT HUGHES (YR)	SIZE OF DEFECT (MM) HORIZONTAL × VERTICAL	SUTURE USED	ANTERIOR LAMELLA RECONSTRUCTION	DAYS UNTIL DEHISCENCE	SIZE OF DEHISCENCE	DAYS UNTIL FLAP DIVISION	SUBSEQUENT PROCEDURES	FOLLOW-UP (MO)
1	77	29 × 7	7-0 polyglactin and 6-0 plain gut	Bipedicle orbicularis oculi flap and skin graft	8	Nasal 75%	16	None	6
2	60	20 × 5	6-0 plain gut	Skin graft	3	100%	NA	None	122
3	63	15 × 7	6-0 plain gut	Skin advancement flap	11	Nasal 25%	36	Cicatricial lower eyelid retraction repair	71
4	78	15 × 8	6-0 plain gut	Skin graft	1	100%	NA	None	9
5	68	30 × 6	7-0 polyglactin and 6-0 plain gut	Skin advancement flap	2	Central 50%	31	None	3
6	69	14 × 7	6-0 polyglactin and 6-0 plain gut	Skin advancement flap	Unknown; flap had dehisced when patient returned for planned flap division	100%	NA	None	6
7	79	20 × 6	6-0 plain gut	Bipedicle orbicularis oculi flap and skin advancement flap	10	Nasal 60%	30	None	6
8	84	13 × 6	6-0 plain gut	Skin advancement flap	5	100%	NA	None	7

NA, not applicable.

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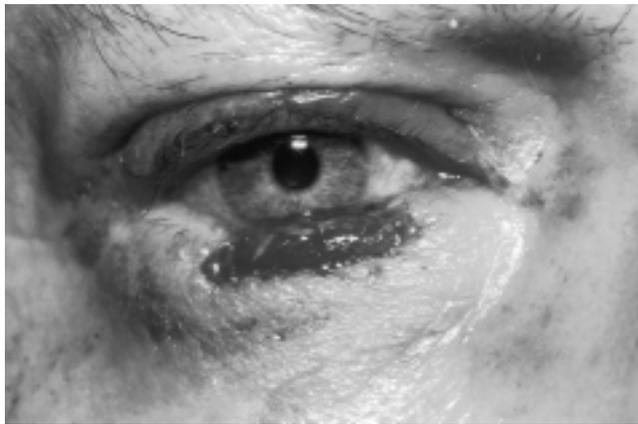
to heal spontaneously with the application of erythromycin ophthalmic ointment as the sole therapy (Figures 1 and 2). Division of the residual Hughes flap was performed between 16 and 36 days in the four patients whose dehiscence did not involve the entire conjunctival pedicle.

Although the ultimate result was satisfactory in each



**FIGURE 1A**

Case 2. Right lower eyelid defect after tumor excision.



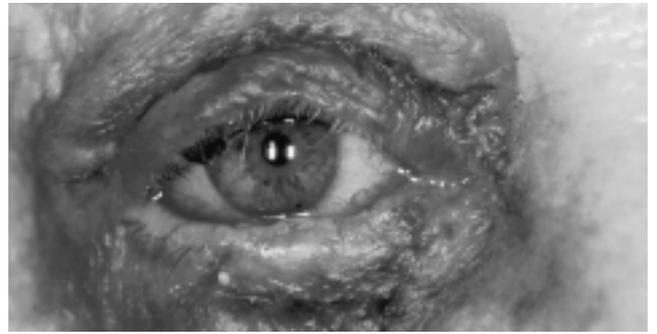
**FIGURE 1B**

Case 2. Complete dehiscence of Hughes conjunctival flap 3 days postoperatively. Eyelid left to heal spontaneously.



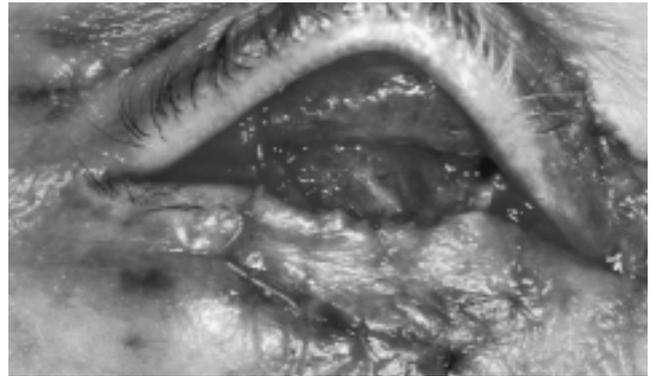
**FIGURE 1C**

Case 2. Appearance 5 months postoperatively.



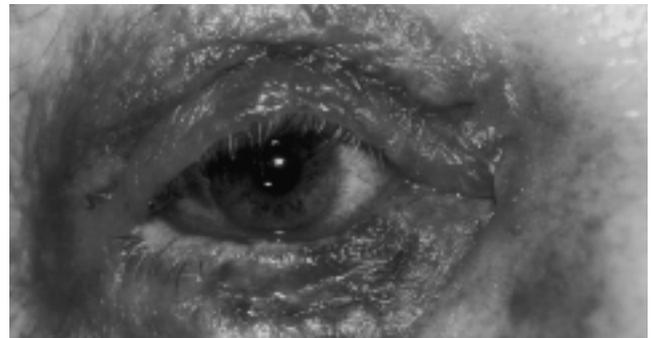
**FIGURE 2A**

Case 4. Complete dehiscence of Hughes conjunctival flap to right lower eyelid 1 day postoperatively.



**FIGURE 2B**

Case 4. Attempted repair of Hughes flap.



**FIGURE 2C**

Case 4. Secondary dehiscence of conjunctival flap 2 days later. Eyelid left to heal spontaneously.



**FIGURE 2D**

Case 4. Appearance 9 months postoperatively.

case, one patient (case 3), who had dry eyes from Sjögren's syndrome and tight skin from chronic sun exposure, eventually required secondary surgery to treat 1 to 2 mm of eyelid retraction and mild lagophthalmos (Figure 3). Of note is that this patient had the smallest conjunctival flap dehiscence.

Follow-up ranged from 3 to 122 months (median, 6.5 months).

## DISCUSSION

The Hughes procedure is a reliable method for reconstructing full-thickness lower eyelid defects. Such defects may range in size from relatively small, segmental defects (especially nasally) to larger defects that comprise the entire lower eyelid. Although the original description involved splitting the upper eyelid margin as the tarsoconjunctival flap was elevated, the operation was modified subsequently to preserve the upper eyelid margin and decrease complications related to the donor site. Traditionally, the conjunctival pedicle was divided several weeks to months after the primary reconstruction to ensure that adequate vascularization had occurred. In contemporary practice, however, most surgeons believe that it is appropriate to divide the conjunctival pedicle after 3 to 4 weeks, especially if a bipedicle orbicularis oculi flap can be mobilized from residual eyelid tissue to provide additional nourishment to the tarsoconjunctival flap.<sup>6,7</sup>

Two recent reports by McNab and colleagues<sup>8,9</sup> have demonstrated that satisfactory results may be achieved when the conjunctival pedicle is divided 2 weeks after the initial procedure. This concept is consistent with previous reports by Hargiss,<sup>10</sup> who proposed that two tubed conjunctival flaps would provide satisfactory vascular support equivalent to an apron flap; Leone and Van Gemert,<sup>11</sup> who demonstrated that a free tarsoconjunctival graft could survive if covered by a bipedicle skin-muscle flap; and Leibsohn and associates,<sup>12</sup> who intentionally created a small optical buttonhole in the Hughes tarsoconjunctival flap without compromising the vascular supply to the reconstructed lower eyelid.

The favorable outcomes of the patients reported herein suggest that a dehiscent Hughes flap does not necessarily need to be repaired. Additionally, the results support the hypothesis that early division of the conjunctival pedicle may be performed without undue risk of functional or aesthetic complications. Limiting the eyelid-sharing interval may be useful, in particular, in patients whose opposite eye has poor vision.

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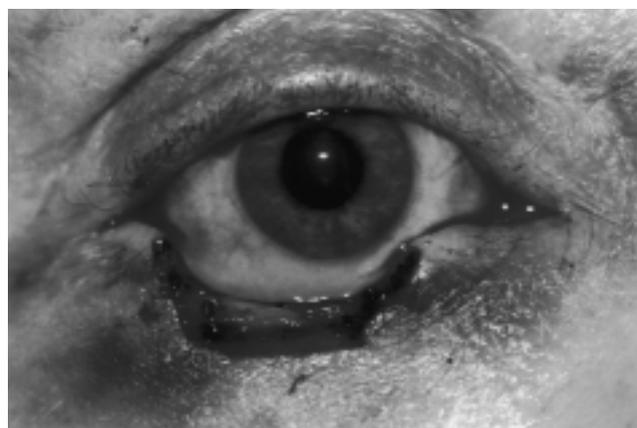


FIGURE 3A

Case 3. Right lower eyelid defect after tumor excision.



FIGURE 3B

Case 3. Dehiscence of medial 25% of Hughes conjunctival flap 11 days postoperatively. Eyelid left to heal spontaneously, and residual flap divided 36 days later.



FIGURE 3C

Case 3. Appearance 20 months postoperatively, immediately prior to "split-level" grafts (hard palate mucosa graft to posterior lamella and full-thickness skin graft to anterior lamella) to decrease exposure of right eye. Patient has Sjögren's syndrome.

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## DISCUSSION

DR BARTLEY R. FRUEH. I recalled being taught that one should wait 2 months before taking down a Hughes flap, so I looked through textbooks on my shelf to see what they said. Merrill Reeh in 1963<sup>1</sup> said to wait for 2 months or more. Frank English in 1975<sup>2</sup> indicated 4 weeks was sufficient. In the text by Merrill Reeh, Charles Beyer, and Gerry Shannon in 1976<sup>3</sup>, they indicate that approximately 2 months is the proper interval for dividing the flap. Joe Flanagan, one of our members, in 1984<sup>4</sup> suggested that 4 to 6 weeks is the appropriate interval. And in my most recent text, Charles and Chris Stephenson in 1997<sup>5</sup> indicate the tarsoconjunctival flap may be divided after 3 to 4 weeks. We know from the recent work of McNab and colleagues<sup>6</sup> that a 2-week interval is sufficient.

In general, the indication for a Hughes flap is a relatively shallow lower lid defect that has a tarsal deficit larger than can be closed effectively with a one-stage procedure, such as a Tenzel semi-circular flap. In most patients, the loss will need to be greater than 60% of the length of the lid to meet this criterion. Half of the eight patients in this study had defects of 15 mm or less. I query whether these could have been repaired by a one-stage procedure that would have produced a lid that would be as good as, or

better than, the Hughes reconstruction functionally and cosmetically.

There are two cases in this series that are particularly instructive; cases 2 and 4, one of which had a 20-mm defect and one of which had a 15-mm defect, each with a skin graft forming the anterior lamella. Each had a 100% dehiscence of the conjunctival flap, one at day 1 and one at day 3, so very little new vessel formation from surrounding tissues could have occurred by that time. Essentially, each was then a graft on a graft, something that should not work.

In the mid 1970s, I asked Dr Hughes at a cocktail party whether he really thought there was sufficient vasculature in the conjunctiva to nourish a thick piece of tarsus at the end of it, as we suppose is happening with a Hughes flap. He assured me that the tarsal plate in a Hughes flap was nourished by its conjunctival pedicle.

Based on Bartley and Messenger's two cases, perhaps Dr Hughes was mistaken. Perhaps the nourishment for the tarsus and skin graft comes from the rich vascular supply of the remaining lid and the conjunctival flap is a secondary and nonessential contributor. Additional evidence for this is that a full-thickness lid margin graft may be taken from one lid and placed in another. Would our patients do just as well with a one-stage grafting of the tarsal plate, with the anterior lamella formed by either a flap or a skin graft, eliminating the conjunctival pedicle flap?

Thank you, Dr Bartley and Ms Messenger, for an intriguing presentation that gives us a lot of food for thought.

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DR JOSEPH C. FLANAGAN. The Hughes flap could be opened much earlier than we thought in the past. There are other alternatives to this flap with the Tenzel flaps and other materials, such as a free tarsal graft from the upper eyelid with a covering flap, or materials such as Alloderm,

hard palate, or auricular cartilage have to be covered with a flap and but not a free full-thickness skin graft.

DR GEORGE B. BARTLEY. With regard to defects of 15 mm or less that could have been repaired by alternative methods, certainly there are many arrows in the quiver, if you will, that one could use. I find, though, that the Hughes flap is much easier and quicker to do than, for example, a Tenzel semicircular flap. The price one pays, of course, is the eyelid-sharing interval. A Hughes flap can sometimes be performed in 15 to 20 minutes, particularly for a nasal defect, which constituted the smaller flaps in this series. Defects close to the canaliculus are more difficult to close with a sliding flap than, for instance, a similar-sized defect laterally. With regard to the two cases that were graft-on-

graft procedures, I completely agree with Dr Frueh that by all traditionally accepted principles of surgery the tissues should have died and looked pretty bad, but in fact they turned out to be satisfactory. Bipedicle orbicularis oculi flaps as described by Doxanas were not used in those two cases, although doing so perhaps would allow us to do what Dr Frueh is suggesting. That is, the tarsoconjunctival flap could be brought down, covered with muscle that will nourish it, and then the conjunctival flap could be divided on the table. Alternatively, perhaps one could simply use a free tarsal graft for the posterior lamella and a skin graft or skin flap for the anterior lamella and avoid the eyelid-sharing portion of the procedure altogether. So, Dr Frueh is right that those two cases really are the most instructive ones in the series.