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## Punctal Ectropion repair using the Raus–Garito clamp

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### ABSTRACT

**Purpose:** To evaluate the results from the correction of ectropion of the punctum lacrimale in lower eyelids with a new surgical clamp. **Design:** Prospective study. **Methods:** Eighty eight eyelids in 55 patients with mild and moderate ectropion were included in the study. An excision of a diamond of tarso-conjunctiva with retractor reattachment and concomitant correction of horizontal lid laxity, if present, was performed. **Results:** Resolution of tearing was obtained in 77 eyes. In 11 eyes, persistent tearing was reported. **Conclusion:** Repair of early to intermediate ectropion of the lacrimal punctum using the Raus–Garito clamp is associated with a good functional and cosmetic outcome.

### KEYWORDS

ectropion; epiphora; eyelid; instrument; surgery

### Introduction

A tearing eye due to an ectropion is very frequently encountered but under-diagnosed in everyday practice. Involitional ectropion and horizontal lid laxity is not always generalized. It can be limited to the medial or lateral canthus or even to the area of the lower punctum. It can also occur in paralytic, cicatricial, and mechanical ectropion.

Lower lid retractor desinsertion or laxity can contribute to a variable extent to eversion of the punctum.<sup>1</sup> We speak of ‘ectropion’ as soon as the lower punctum is not in apposition to the globe and visible on simple slit lamp examination. When this occurs, blinking no longer allows the physiological tear drainage pump to function, normally leading to tear overflow.<sup>2</sup> The resulting epiphora and the repeated need to wipe aggravates the lid laxity because most patients wipe their eyes from the nose laterally in the direction of the ear. The exposed conjunctiva may induce secondary blepharoconjunctivitis and edema which in turn further accentuates the ectropion. This condition can also be of cosmetic concern to the patients.<sup>3</sup> In patients with involitional ectropion, the surgeon can perform a lateral wedge excision or tarsal strip procedure<sup>4</sup>, but if the punctum is not apposed to the globe with simple lateral traction of the lower eyelid, none of these techniques will be enough to achieve a good functional result and an additional procedure will be mandatory. Several techniques are described in the literature:

- (1) A transconjunctival plication or reinsertion of the retractor muscle to the tarsus in the area below the lacrimal punctum, without shortening of the posterior lamella<sup>4</sup>
- (2) A tarso-conjunctival diamond excision below the punctum with tightening of the lower lid retractors by one internal suture passing through the retractors, the conjunctiva at the lower edge of the diamond excision, the pretarsal conjunctiva and the tarsus and making a buried knot.<sup>3</sup>
- (3) A tarso-conjunctival diamond excision below the punctum with tightening of the lower lid retractors by a double armed viracyl 5/0 suture passing through the retractors, the tarsus, the pretarsal conjunctiva to reinsert the retractor muscle to the tarsus. The two needles are then externalized to the skin at the lower border of the diamond with a knot on the eyelid.<sup>3,5</sup>

*Most surgeons will evert the lower eyelid with a Bowman probe placed in the lower punctum and canaliculus<sup>3–5,7</sup> and a suture placed several millimeters temporal to the punctum through skin, orbicularis muscle, and superficial tarsus. In that case, care has to be taken not to tear the punctum. An advantage of our clamp to evert the lower eyelid is that it creates a bloodless surgical field.*

Ferguson and coworkers have described a technique to combine a wedge excision, just lateral to the punctum and a modified lazy-T procedure. First, a pentagonal wedge excision 3 mm lateral to the lower punctum is made. The retractors are then picked up, pulled medially through a subconjunctival tunnel and tied off on the conjunctiva 3 mm medial and below the inferior punctum.<sup>8,9</sup> Although all these techniques can give excellent results and have their proper indications, the lower lid retractors are not easily accessible. It also is an extremely vascularized area that tends to bleed easily during surgery. That is why a lot of surgeons are disappointed after trying this type of surgery. However, in many cases of ectropion of the lower lid, a 'traditional' lateral wedge excision or tarsal strip procedure is not yet necessary to obtain a good apposition of the punctum lacrimale after surgery. Moreover, sometimes a horizontal shortening of the lower eyelid alone is not enough to correct the ectropion and an additional diamond excision of tarso-conjunctiva (DET) appears to be mandatory to bring the punctum in contact with the globe again. For those cases, we developed the Raus clamp (Figure 1). It makes the surgery easier and faster. Moreover, its use is *easy to learn* like in the philosophy of John Dewey: "See one, do one, teach one". Another advantage is that the administration of blood thinning drugs does not have to be interrupted before surgery. We combine the use of the

Raus/Garito clamp with high frequency (4MHz) radio wave surgery. We think that our clamp is very versatile and can be helpful for multiple techniques of ectropion surgery. This type of surgery can even be used as intervention on its own in all cases of punctal ectropion without significant horizontal lid laxity. Moreover, it can be used repeatedly on the same eyelid during the same intervention. It can also be used in combination with a lateral wedge excision or tarsal strip procedure in all cases with pronounced horizontal lid laxity except in patients with an extreme medial canthal tendon laxity

### Materials and methods

Patients with involuntional ectropion can be divided into different groups:

- (1) patients with mild or punctal ectropion and no or very limited horizontal lid laxity
- (2) patients with pronounced ectropion with good apposition of the punctum upon lateral traction on the lower eyelid
- (3) patients with pronounced ectropion and remaining punctal ectropion upon lateral traction on the lower eyelid

Lid laxity was evaluated with the pinch test whereby if the lid could be pulled more than 4 mm away from the globe we considered it to be lax. Sometimes this test is also called 'Eyelid distraction test'. It was described in 1975 by Hill.<sup>10</sup> Another valuable test to measure lower lid laxity is the snap-back test. We pull the lower lid away and down from globe for a few seconds and check how long it takes before it returns to its original position without the patient blinking.<sup>11</sup> When it takes more than 2–3 seconds for the eyelid to return to its original position a DET surgery can be considered.

Although the horizontal lid length appears not to increase with age<sup>12</sup> even if the lateral canthal tendon is elongated we try to avoid a lateral tarsal strip procedure but only perform a full thickness lid shortening laterally. Indeed when the tarsal strip is not fixated properly, the procedure tends to induce a lateral ectropion post-operatively with pooling of the tears in a lateral tear lake. With limited medial lid laxity a tarso-conjunctival diamond excision is performed in the medial part of the lid.<sup>3</sup> When the lower lid retractors appear to function properly (snap-back test of <3 seconds or pinch test not more than 4 mm) a simple excision of tarso-conjunctiva with an internal suture that includes the retractors, tarsus and the conjunctiva can be sufficient to re-establish proper evacuation of tears. If not, an externalization of the suture can additionally invert



Figure 1. Diamond excision of conjunctiva.

the lower eyelid to achieve an apposition of the punctum against the globe. *Indeed, when the suture exits the skin more inferiorly than the internal wound, the eyelid will be inverted when making the knot.*

For the patients of group 1 we only performed a tarsoconjunctival diamond excision with tightening of the lower lid retractors (DET) but without a lateral wedge excision.

The patients of group 2 can be helped by a simple lateral wedge excision or a tarsal strip procedure and or not good candidates for a DET. None such cases were included in this article.

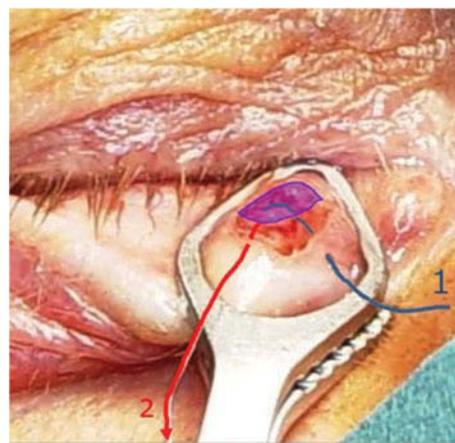
The patients of group 3 underwent a combination of lateral wedge excision and a DET. Written informed consent from all the patients was obtained before surgery. All patients underwent a standard eye examination and an irrigation test was performed to test the patency of the tear ducts. In patients with lacrimal obstruction a Ritleng Monoka silicone tube was inserted during the same intervention but in these cases the surgery was done under general anesthesia and with the cooperation of an ENT surgeon.

### **Surgical technique of diamond excision with the Raus-Garito clamp**

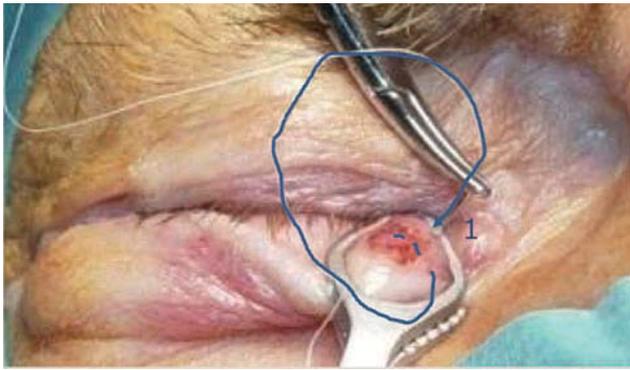
In patients under local anesthesia, first a topical anesthetic is instilled. The skin around the eye is disinfected e.g. with a 10% Povidone-iodine solution and the area is draped. For patients under local anesthesia, a local anesthetic with epinephrine is injected under the skin and deep under the orbicularis muscle. This deep infiltration is preferable to anesthetize the muscle and tarsus and to limit discomfort when the clamp is closed and the eyelid is everted. The lid margin of the lower eyelid in the nasal third is pulled upwards using a forceps with teeth. The complete loop of the clamp is slid over the eyelid with the concave side on the skin side (Figure 1). The arms of the clamp are pinched together before the clamp is closed with the screw. Thanks to the angulated form of the clamp, less traction is needed to evert the eyelid until the clamp rests on the skin. *This means less traction on the medial canthal tendon.* The aim of the teeth in the loops of the clamp is to prevent slipping of the clamp from the eyelid during eversion. Then a superficial diamond-shaped fusiform wedge of conjunctiva is excised inferior to the lower margin of the tarsal plate with the tip of the diamond pointing to the lacrimal punctum (Figure 1). The height of this excision is determined by the amount of punctal ectropion but is limited by the size of the loops of the clamp. The greatest vertical dimension should lie beneath the punctum.

However, when this surgery is combined with the implantation of a silicone plug or a silicone tube, the plug or silicone stent should be inserted first and the clamp will be placed a little more laterally to avoid the plug/stent popping out when the clamp is closed. We have found that the inverting effect of the surgery will be nearly as good when placing the clamp a little more laterally. *So, although we have not seen any problems of canalicular patency after surgery with our clamp, to avoid crushing the canalicular tissue, the surgeon could decide to place the clamp somewhat laterally to the lower punctum.* Also, with the clamp more laterally, everting of the lid is easier. The inverting technique can be used or repeated elsewhere on the same eyelid.

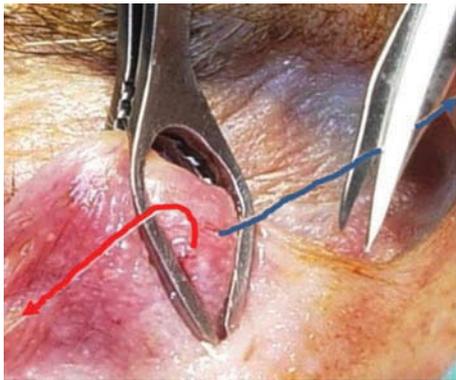
With the excision of a fragment of conjunctiva, the anterior expansion of the lower lid retractors is exposed. For the inverting suture we use a double-armed 5/0 Vicryl suture. Both needles are initially passed through the retractors in the center of the diamond excision. Then the two arms have to be passed backhanded through the apex of the diamond, adjacent to the punctum (Figure 2.). In this way the lower lid retractors are advanced to the lower border of the tarsus. In a next step each suture arm is passed through the full thickness of the lid at the inferior apex of the diamond (Figure 3). When the clamp is lifted from a horizontal to a vertical position, it is easy to switch from the conjunctival to the cutaneous side of the eyelid to pick up the needles on the skin side (Figure 4.). With a patient under blood diluting drugs, the surgeon can prefer to make the knot before taking out the clamp. However, the slit in the outer arm of the clamp makes it possible to take the clamp off and adjust the position of the punctum when tying the knot. For a minimal ectropion, limited to the punctal area, one could prefer not to externalize the suture with a knot on the skin but just to place one conjunctival suture. In this case one arm of the *double armed Vicryl 5/0* suture is passed through the apex of the diamond,



**Figure 2.** Reinsertion of retractor muscle.



**Figure 3.** Inversion of the eyelid.



**Figure 4.** Sutures passed through the eyelid.

immediately below the punctum. The other arm is passed through the conjunctiva below the inferior apical cut. With this second arm the lower lid retractors are picked up and after 'preparing' the knot, the clamp can be removed thanks to the slit in the top of (both arms of) the clamp. The knot can then be tied and buried in the wound. The diamond excision can be combined with a horizontal shortening technique, but it should precede it: if the diamond excision would be performed after the wedge excision, everting the lid to do the diamond excision is very difficult and there is a risk of breaking the sutures of the wedge excision. To prevent a (temporary) pit in the skin, the surgeon can tie the suture over a bolster. In this case the suture can be taken out after 10–14 days.

An antibiotic ointment is applied in the lower fornix and on the skin. Inverting sutures in combination with excision of a diamond of conjunctiva can be used anywhere on upper or lower eyelid to aid other types of ectropion repair.

## Results

In this study 88 eyelids in 55 patients with mild and moderate ectropion and different degrees of laxity of the lower eyelids were included. Patients with severe laxity of the medial canthal tendon were excluded.

Although paralytic ectropion is not an exclusion criterion for our technique, in this article, no patients with paralytic ectropion were included. All patients underwent a shortening of the internal lamella below the punctum and a retractor muscle advancement. Patients with pronounced ectropion, a pinch test of >4mm, and remaining punctal ectropion upon lateral traction on the lower eyelid also underwent a lateral wedge excision (25 eyes). Thirty-one patients were female, 24 were male. The average age at the time of surgery was 72.56 years (52–85). Most of the patients presented with the chief complaint(s) of tearing (48 patients), eyelid malposition (3 patients), itching (2 patients), nasal BCC (1 patient, 1 eyelid), aesthetic problem of ectropion (1 patient). Additional presenting chief complaints included dry eye, red eye (with or without tearing or irritation) and ocular irritation or a combination of symptoms. We recorded all complaints individually and for each eye separately because patients with bilateral disease sometimes present with different symptomatology for each eye.

Concomitant procedures at the time of initial surgery were:

- Placement of punctum plugs ('clou trou') to dilate a small punctum: 11 patients (20 eyes)
- Lateral wedge excision: 15 patients (24 eyes)
- Monocanalicular intubation: 8 patients (11 eyes)
- Upper lid blepharoplasty: 2 patients (4 eyes)
- Excision of Xanthelasmata: 1 patient, 1 eye
- Pediculated flap from upper to lower eyelid: 1 patient (2 eyes)
- Shortening of caruncula: 2 patients (2 eyes)
- Ptosis correction: 1 patient (2 eyes)

When we insert a silicone tube or perforated punctal plug, the stent is usually taken out after 6 weeks. That is why we scheduled the last postoperative examination about 8 weeks after surgery. At that time, 16 of the 88 eyes still showed a visible punctum with slit lamp examination with 1 eye presenting a residual ectropion due to a broken suture; so in 16 eyelids the ectropion was not anatomically corrected. However as much as 77 eyes reported complete resolution of tearing. *Of the 16 patients where the punctum was still visible with slit lamp examination after surgery, only 11 had reduced or occasional tearing. In patients where no concomitant silicone intubation was performed, the lower canaliculus might be injured by closing the clamp and pinching the canaliculus. However, in the first 17 eyelids we encountered no problems in passing a Bowman 00 probe a first time at the end of the intervention and a second time after 4 to 6 weeks.*

## Complications

Under correction. Due to postoperative edema, the punctum frequently seems not to be adequately inverted in the days after surgery. Only if this problem persists after 2 weeks, was this considered as under correction (8 eyes). At that time a gentle coagulation of the tarsal conjunctiva in the surgical area can induce an extra inversion. (4 eyes) The intervention can also be repeated in the same area or more laterally (2 eyes). In 2 eyes an extra lateral wedge excision was performed but at the end 1 eye still showed epiphora.

- Overcorrection: (2 eyes) Slight overcorrection in the immediate postoperative period is not exceptional and should not worry the surgeon. If an entropion persists after one week, the Vicryl suture can be removed and massage or soft traction can be applied to the lower eyelid.
- Pit in the skin: the knot on the skin side causes a pit in the eyelid. Sometimes this knot 'vanishes' already after a few days. In most cases we have to wait until resorption of the Vicryl suture. Only in 3 eyes we still noticed a pit after 6 weeks. Needling with a 30G needle helped to bury the knot. *A pit in the skin can be avoided if a small slit is made in the skin so that the suture can be buried.*
- Conjunctival scar: A *small* local scar in the conjunctiva is unavoidable and can even be associated by a limited symblepharon (4eyes). However this symblepharon can be an advantage to avoid relapse of the ectropion and can even compensate a lazy-T. *Also, the patients were not aware of this local symblepharon and never experienced diplopia.*

Most Complications were minor and resolved without sequelae. The most common complaints reported by patients at the initial postoperative examination were persistent tearing, ocular irritation, peri-ocular tenderness, and suture irritation/reactions. In the majority of cases these symptoms resolved by the last follow-up examination apart from the 16 eyes with anatomically uncorrected or recurrent ectropion. In 11 eyes persistent tearing was reported despite anatomical correction of the ectropion

## Conclusions

We think that a DET procedure with our clamp can correct an early ectropion of the lower punctum lacrimale. It promises to be an additional advantage in pronounced cases of ectropion. It is a fast and easy procedure and patients' acceptance is excellent. Even when the tear punctum is still visible after surgery with slit lamp examination, the

epiphora may disappear. Probably a punctum in the lacrimal lake can be enough to relieve the symptoms of tearing, especially in older patients with less tear secretion. For a DET surgery as the only procedure, blood thinning drugs do not have to be stopped and since the procedure only takes 15 minutes, it can be performed in most patients, even if in relatively poor general condition. Although the conjunctival scar can correct some laxity of the medial canthal tendon (MCT), patients with severe laxity of the MCT may need an additional lazy-T correction. *We think that the surgery itself does not weaken the MCT thanks to the angulated form of the clamp with less traction on the ligament, and the short duration of the intervention.* Recently we slightly modified the clamp by making a slit also in the conjunctival arm of the clamp, according to the suggestion of Richard Collin. When the lower lid retractors appear to function properly, this modification will make it possible to limit the surgery to a simple excision of tarso-conjunctiva with an internal suture that includes the retractors, tarsus and the conjunctiva as described by Richard Collin.<sup>3</sup> However further tests have to be performed to confirm our first optimistic results with this modified clamp.

## Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article. The clamp is manufactured and distributed by LifeSciences Technology, <http://www.jongarito.com>

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