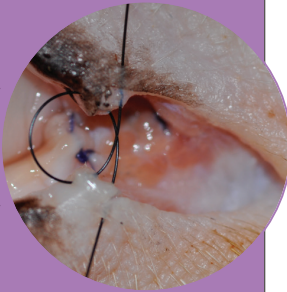


PRACTICAL TECHNIQUES FROM THE NAVC INSTITUTE

Addressing Brachycephalic Ocular Syndrome in the Dog

Caryn E. Plummer, DVM, Diplomate ACVO
University of Florida



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Many people are drawn to the juvenile features of the short-faced, big-eyed brachycephalic dog. However, those big eyes—with their endearing qualities—can be very problematic for these breeds.

The majority of small dogs, especially the brachycephalic breeds, have palpebral fissures that are too long to provide adequate coverage of the prominent globes because of macroblepharon (an abnormally large eyelid opening).¹ In many cases, even if these dogs can complete an effective blink, their lids cannot close completely (lagophthalmos), or frequently, enough to lubricate and protect the ocular surface.

Inability to effectively blink predisposes the eyes to chronic exposure, which can result in a wide variety of corneal problems, including, but not limited to:

- Corneal ulcerations and erosions
- Vascular keratitis
- Pigmentary keratitis
- Corneal fibrosis.

All of these problems, which may be combined with concurrent keratoconjunctivitis sicca, subsequently affect corneal clarity, and can result in pain and decreased vision.^{2,3}

COMPONENTS OF BRACHYCEPHALIC OCULAR SYNDROME

The “so-called” *brachycephalic ocular condition* (**Figure 1**), similar to *brachycephalic respiratory condition*, can be considered a syndrome that—in addition to macroblepharon and lagophthalmos—

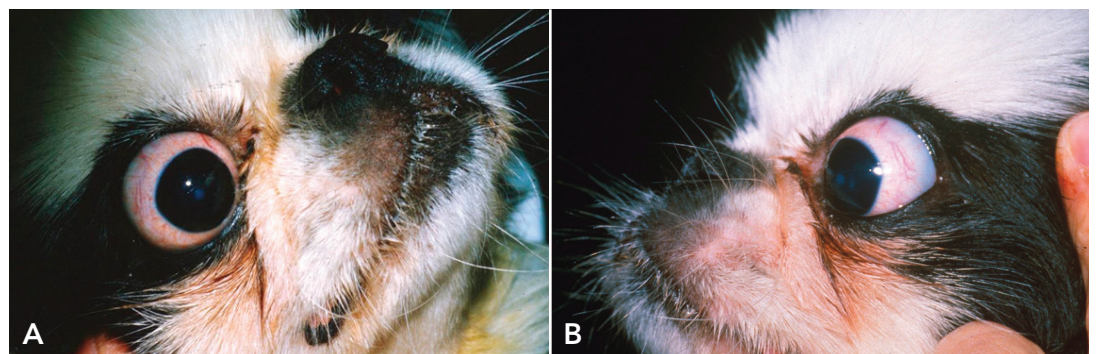


FIGURE 1. Classic appearance of brachycephalic ocular syndrome in a dog. Note the enlarged palpebral fissure that allows excessive “show” of the sclera, poor coverage of the cornea, trichiasis from the medial canthus and a nasal fold, and tear staining present nasal and ventral to the eye (A). Profile view of the same individual. Note the prominent globe (emphasize by the shallow orbit), medial canthal entropion and trichiasis, and tear staining from epiphora (B).

may include a variety of other factors or clinical signs.¹⁻⁵ Brachycephalic breeds often have:

- **Medial canthal entropion**, in which the lower eyelid, adjacent to the medial canthus, rolls inward and covers up, or occludes, the lower nasolacrimal puncta^{2,5,6}
- **Epiphora and tear staining** due to inappropriate tear fluid drainage that, sometimes, are significant enough to cause moist dermatitis ventral to the eye
- **Trichiasis**, or hairs that deviate toward the cornea from the medial caruncle or nasal skin folds adjacent to (sometimes contacting) the cornea;⁶ this hair chronically irritates the ocular surface—even if the patient does not demonstrate discomfort—and can contribute to keratitis and ocular melanosis.^{2,3,7} The medial caruncle is a raised nodule of conjunctiva overlying glandular tissue that sits in the corner of the eye adjacent to the medial canthus
- **Reduced corneal sensitivity** compared to mesocephalic and dolichocephalic breeds;²⁻⁴ thus, while afflicted dogs may not exhibit acute or severe corneal pain, diminished innervation can contribute to delayed recognition of the problem and ongoing damage that leads to impaired corneal wound healing
- **Quantitative or qualitative tear deficiencies**, which can further exacerbate corneal injury
- **Shallow orbits**, which offer considerably less protection of the globe than the deeper orbits of their mesocephalic or dolichocephalic counterparts.²⁻⁴ This orbital anatomy, especially when combined with excessively long palpebral fissures, greatly increases potential for traumatic proptosis, a globe-threatening condition in which the eyelid margins become entrapped behind the equator of the globe, making it impossible for the patient to blink and protect the anterior structures of the globe. Damage to the optic nerve and extraocular muscles is common when the initial injury occurs, and, if the condition is not promptly repaired, exposure, corneal ulcerations, and subsequent globe rupture can occur.

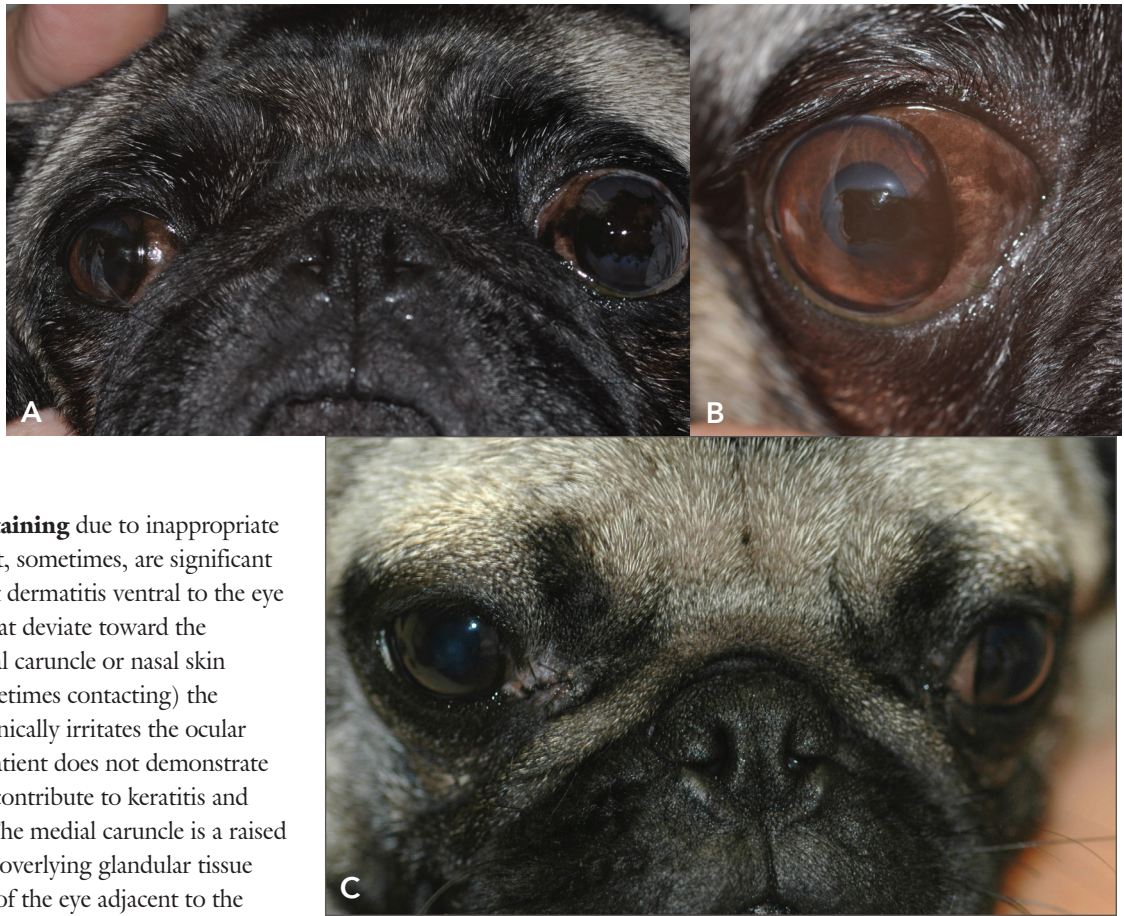


FIGURE 2. A pug dog with brachycephalic ocular syndrome (A and B); another pug dog following medial canthoplasty (C).

SURGICAL APPROACH

In a patient with severe lagophthalmos and resultant ocular disease, a procedure known as *medial canthoplasty* can help considerably (**Figure 2**).¹⁻⁸ Although it does not correct all anatomic and physiologic features that threaten globe health and security, it can be very effective at reducing exposure and frictional irritation that can lead to keratitis and pigmentation.

This procedure corrects the characteristics of brachycephalic ocular syndrome by:

- Reducing the length of both the upper and lower eyelids and overall length of the palpebral fissure
- Everting the medial inferior entropion
- Relieving functional obstruction of the nasolacrimal apparatus
- Removing the hairy medial caruncle and any additional medially deviated trichiasis.

By improving globe coverage, effectiveness of the blink mechanism may be enhanced, tear fluid may be better distributed across the ocular surface, and the risk of proptosis may be reduced.

MEDIAL CANTHOPLASTY: STEP BY STEP

Following careful client counselling and patient selection, the procedure is performed under general anesthesia. Patients should be suitable candidates for general anesthesia and clients should be prepared for the requisite postoperative care. Owners will be expected to maintain the patient in an Elizabethan collar until suture removal and to administer topical and oral medications diligently after surgery.

Preparation

1. Under general anesthesia, clip the hair of both eyelids and cleanse and prepare the surgical site with betadine solution diluted in 0.9% saline to a concentration of 0.5%. Note that betadine is the only antiseptic that should be used near the eye; all others, including chlorhexidine, can cause corneal ulceration.
2. Carefully clean out the palpebral fornices with sterile cotton-tipped applicators and rinse the eyes and lids with saline or eye wash.
3. Use a caliper or other fine measuring device to measure the length of each eye's palpebral fissure and the upper and lower eyelids of both eyes (**Figure 3**). Most of these dogs have excessive lid length, but length may not be symmetrical between upper and lower eyelids or between eyes (see **Determining Eyelid Fissure Size**).

Surgery

1. Identify the upper and lower nasolacrimal puncta at the medial canthus (**Figure 4**), and cannulate these puncta and ducts to prevent inadvertent damage during surgery. Leave cannulas in place for the duration of the procedure.

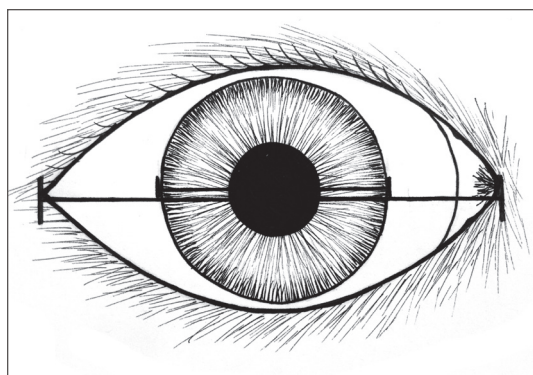


FIGURE 3. Illustration depicting the length of the palpebral fissure relative to the corneal diameter. A palpebral fissure length is usually considered excessive if it is longer than the corneal diameter by more than 6 to 8 mm.

Specific instruments and nasolacrimal cannulas may be purchased for this purpose; however, a large gauge suture, such as 2-0 blue or green monofilament, or a short small-gauge IV catheter (24- or 25-gauge) threaded into the duct may be employed, especially if the hub of the catheter is removed to prevent interference with tissue access.

2. Identify the area of tissue to be resected (**Figure 5**) and make an incision with a No. 64 Beaver blade (beaver-visitec.com) in the skin around the medial canthus to delineate the portions of the eyelid margin, medial caruncle, and conjunctiva medial to the canthus to be removed. In most cases the incision will extend almost to the level of the nasolacrimal puncta, but this will vary on a case-by-case basis depending upon the position of the puncta and the overall length of the fissure. Do not assume that by shortening the upper and lower eyelid lengths by a certain amount that the final length of the palpebral fissure will be shortened by the same amount. *When the canthus is reaposed, its length will be shorter than is anticipated.*
3. Undermine the section to be resected with small tenotomy or Westcott scissors, taking care to avoid the nasolacrimal apparatus (**Figure 6**). Delicately excise any remaining hairs and their follicles in the medial conjunctiva.
4. Close the surgical site in 2 layers:
 - Appose the deep conjunctival layer with a small-gauge absorbable suture, such as 6-0 Vicryl (ethicon.com), in a simple continuous pattern, with the knots buried away from the corneal surface (**Figure 7**).
 - Repair the medial canthus with a figure-of-8 suture (**Figure 8**, page 24), and close the remainder of skin with simple interrupted small-gauge nonabsorbable sutures, such as 5-0 nylon (**Figure 9**, page 24).
 - It may be helpful to place one partial thickness horizontal mattress tarsorrhaphy suture through the eyelid margin, adjacent to the medial canthal repair, to reduce tension as the site heals.
5. Warn the client that the initial appearance of the palpebral fissure will seem small, especially with a temporary tarsorrhaphy in place, but once the sutures are removed, the pet's appearance will be normal.

Ideally, this procedure should be performed with the aid of magnification to ensure that tissue dissection and suture placement is exact.

Determining Eyelid Fissure Size

When determining ideal eyelid fissure size, it is helpful to begin with an idea of what the individual dog's ideal eyelid length would be, and then plan to make both palpebral fissures that same length.

The average dog's corneal diameter is approximately 14 to 16 mm, but the palpebral fissure length may range between 23 and 38 mm (even longer in some large breed dogs).³ Most dogs do well if their palpebral fissures are approximately 6 to 8 mm longer than their corneal diameter.

However, this is merely a guideline. The perfect eyelid fissure size for an individual depends upon its anatomy and the desired cosmetic outcome. Blepharoplasty procedures involve a degree of aesthetic awareness and a good understanding of the required function of the eyelids.

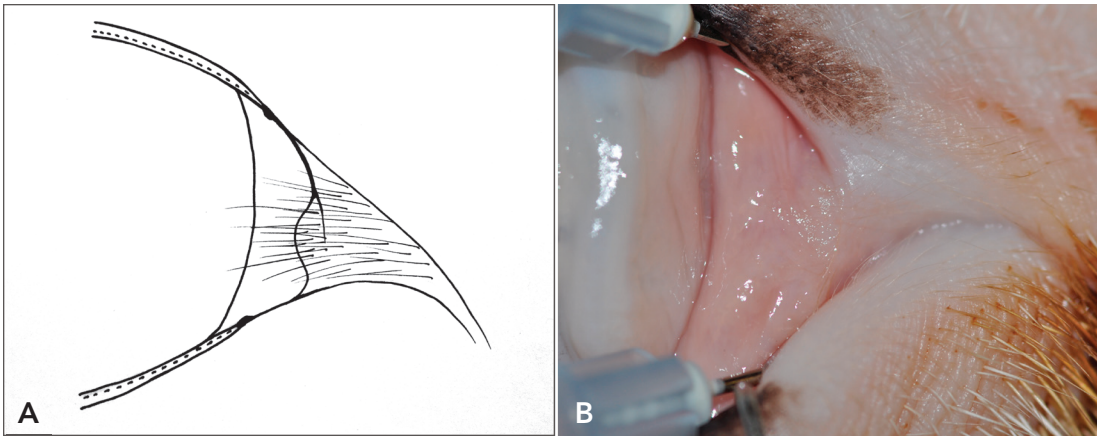


FIGURE 4. Illustration of the medial canthus being rolled out in the nasal direction, revealing the medial caruncle and trichiasis from that caruncle and medial conjunctiva (A). Image of the medial canthus; note that the nasolacrimal puncta have been cannulated (B).

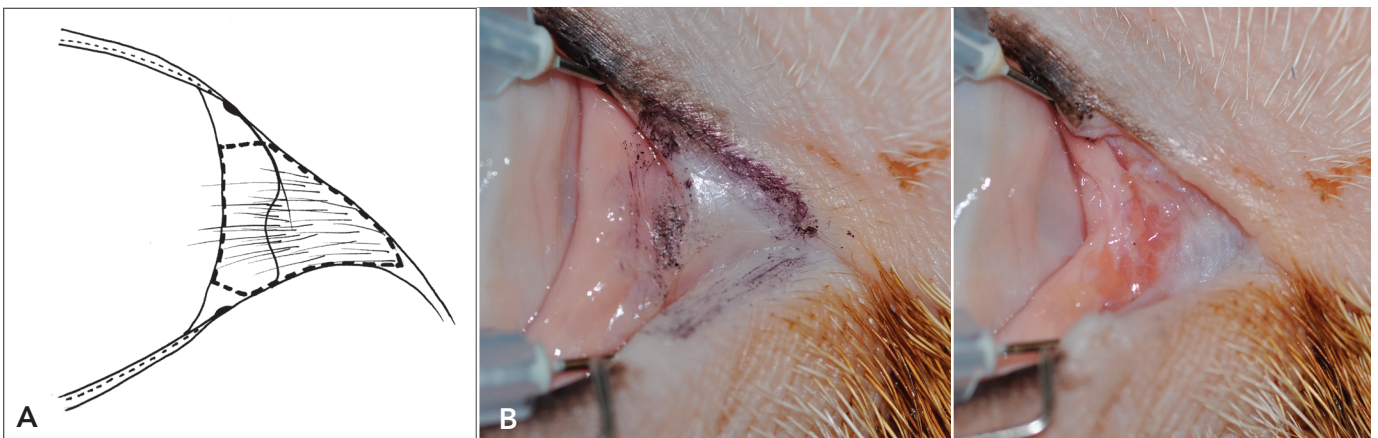


FIGURE 5. Illustration of the hairy medial canthus and tissue slated for excision. It is critical to identify the upper and lower nasolacrimal puncta and cannulate them to prevent iatrogenic and inadvertent damage to them during surgery (A). A surgical marker has been used to highlight the tissue to be removed (B).

FIGURE 6. Appearance of the medial canthus after excision.

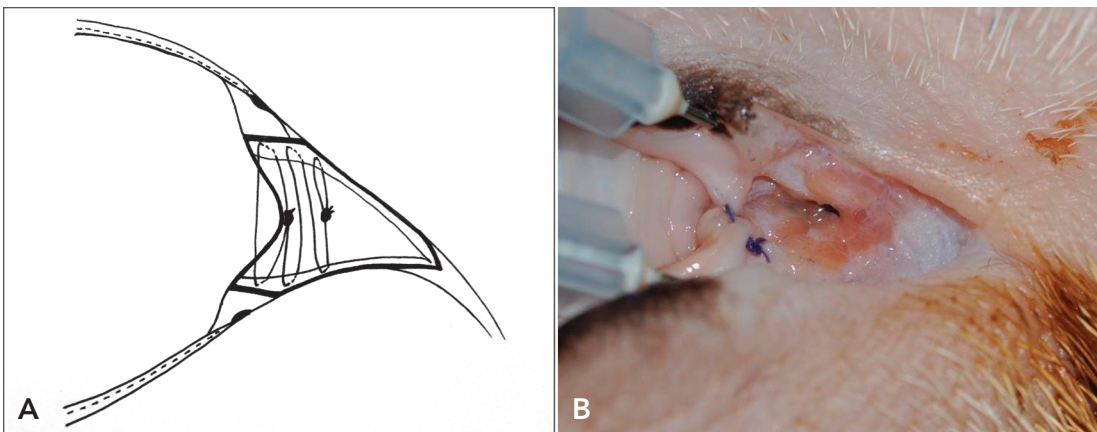


FIGURE 7. Illustration of the deep layer of closure of the medial canthus: The conjunctival tissues are closed with a small gauge absorbable suture (6-0 Vicryl) used in a simple continuous pattern. The knots should be buried to prevent exposure on the conjunctival surface (A). Image of the medial canthus after closure of the deep layer; note that the eyelid margins have been brought closer together by deep closure (B).

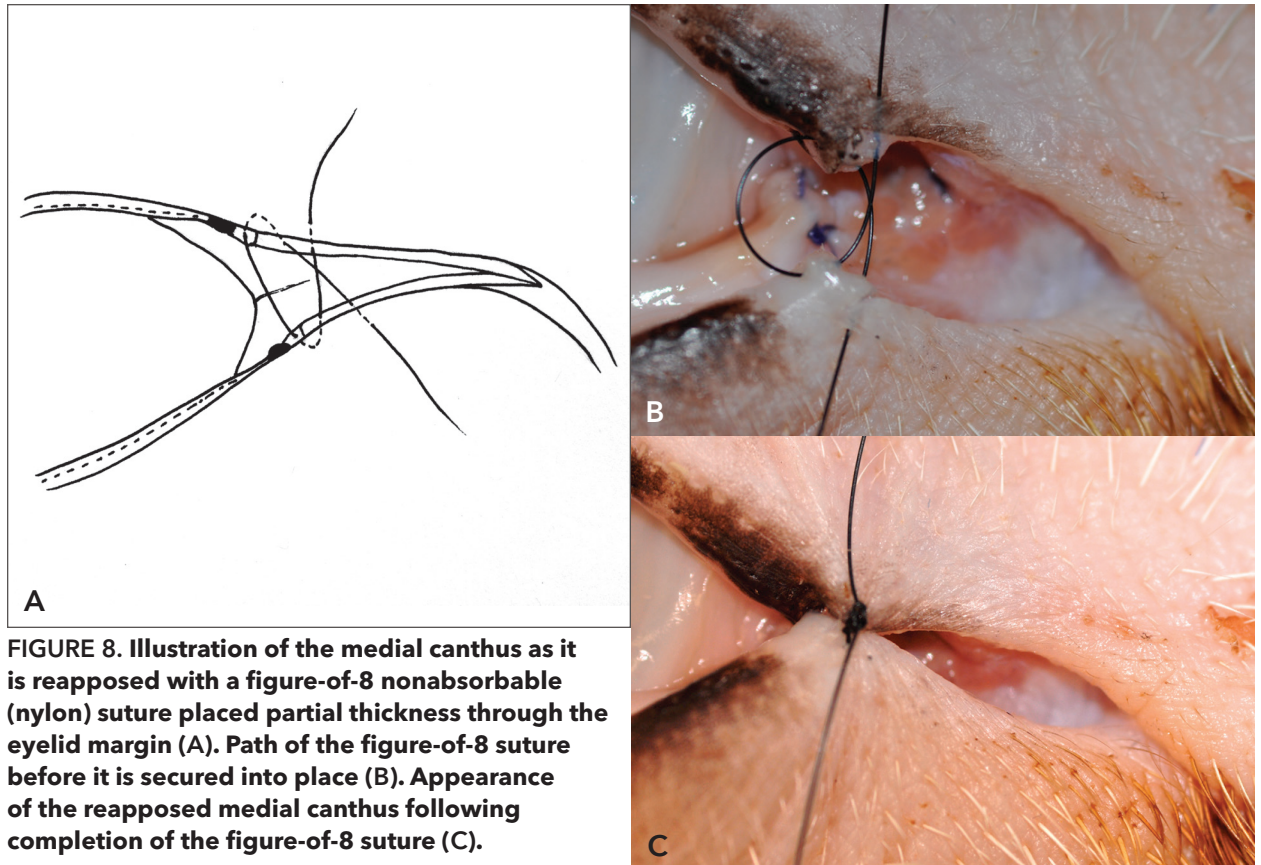


FIGURE 8. Illustration of the medial canthus as it is reapposed with a figure-of-8 nonabsorbable (nylon) suture placed partial thickness through the eyelid margin (A). Path of the figure-of-8 suture before it is secured into place (B). Appearance of the reapposed medial canthus following completion of the figure-of-8 suture (C).

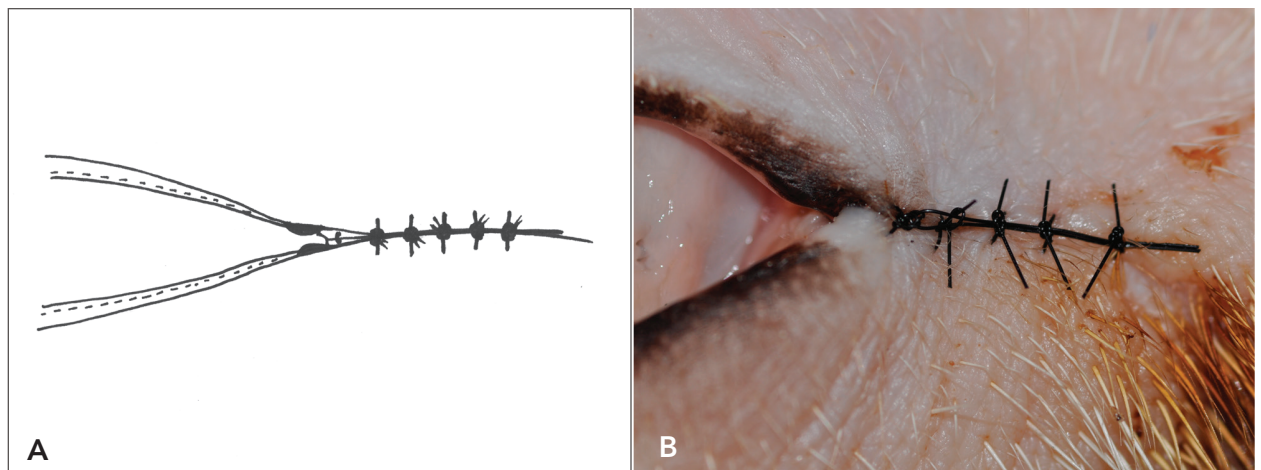


FIGURE 9. The remainder of the skin incision is closed with nonabsorbable suture (5-0 nylon) in a simple interrupted pattern (A). In this image (B), note the tags of the figure-of-8 margin suture have been left long, which allows them to be incorporated into the knots of the subsequent simple interrupted sutures, keeping the tags away from the cornea.

Considerations

While the medial canthoplasty procedure itself is relatively straightforward, several very important considerations require attention and thoughtfulness.

During surgery, it is critical to:

1. Identify and avoid the nasolacrimal ducts during tissue excision and suturing
2. Be meticulous during removal of the medial caruncular and conjunctival hair follicles
3. Be precise during reapposition of the medial canthus.

During the postoperative period, the patient must be treated appropriately.^{2,3}

TABLE.

Medial Canthoplasty: Postoperative Medications

MEDICATION	PURPOSE	DOSAGE
Neomycin-polymixin-bacitracin ophthalmic ointment	Topical antibiotic	Q 6-8 H, both eyes (OU)
Carprofen*	Analgesic Anti-inflammatory	2.2 mg/kg PO Q 12 H for 3-5 days
Meloxicam*	Analgesic Anti-inflammatory	0.1 mg/kg PO Q 24 H for 3-5 days
Tramadol	Analgesic	2 mg/kg PO Q 8-12 H PRN

* Use carprofen or meloxicam

1. Patients should wear an Elizabethan collar to prevent self-trauma and premature removal of sutures. If the incision site and eyelid structure break down, eyelid function and the globe will be compromised.
2. Most patients benefit from topical broad-spectrum antibiotic therapy and a few days of systemic anti-inflammatory and, possibly, analgesic medications (**Table**).
3. Sutures should be left in place for a full 14 days; earlier removal may cause incision failure.

IN SUMMARY

In summary, brachycephalic dogs often display ocular surface disease that can be correlated with their breed-related oculo-facial conformation of elongated eyelids, medial canthal entropion, and caruncular trichiasis. Surgical correction of the adnexal problems may help alleviate some of the clinical problems.

Figure Credit

Illustrations for Figures 3, 4a, 5a, 7a, 8a, and 9a by Lisa Wirth, VMD

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**CARYN E. PLUMMER**

Caryn E. Plummer, DVM, Diplomate ACVO, is an associate professor in comparative ophthalmology at University of Florida College of Veterinary Medicine, where she also serves as chief of the comparative ophthalmology service. Her research interests include corneal wound healing and glaucoma, and she has lectured extensively—both nationally and internationally—on many topics associated with clinical veterinary ophthalmology and animal models of ophthalmic disease, especially glaucoma. Dr. Plummer received her DVM from University of Florida; then she completed an internship in small animal medicine and surgery at Michigan State University and a residency in comparative ophthalmology at University of Florida.

