

Ocular Surgery for Advanced Practitioners Mini Series

Session Two: Surgery of the eyelids and conjunctiva

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Entropion

Entropion surgery is one of the most common eyelid surgeries performed in the dog. The enrolling of the eyelid often leads to painful hair contact with the cornea and conjunctiva and can cause corneal ulceration, vascularization, pigmentation and fibrosis. Depending on breed and face conformation there are a number of different types of entropion that require different surgical techniques.

Entropion can affect the upper or lower lid, the medial canthus and can occur in a combination of ectropion and entropion in patients with a macroblepharon. An upper eyelid entropion is often combined with a loose facial mask that is increasingly pulling down, particularly in older dogs as is commonly seen in English Cocker Spaniels. The drooping upper eyelid can lead to upper eyelid trichiasis and even significantly reduce vision.

Surgical techniques can be divided in temporary and permanent procedures, with the former being used to correct mild to moderate forms of entropion and secondary entropion caused by painful ocular disease, treatment of patients that cannot be anaesthetized or where a permanent correction is not yet advisable (puppies, infected periocular skin).

The most commonly utilized techniques for a permanent correction include the Celsus – Hotz technique as well as the Stades technique and the face lift for upper eyelid trichiasis.

Prior to entropion surgery it is essential to carefully plan the procedure on the awake patient. During anaesthesia the globe and therefore the eyelid position change significantly making it difficult to achieve good correction without planning. Furthermore, an entropion can be very painful and lead to a retraction of the globe. This will lead to a worsening of the lid conformation. It is therefore essential to apply a local anaesthetic agent to the eye and review the anatomical situation when the eye is completely pain free.

The Celsus – Hotz procedure (Figure 1) and its modifications are suitable to correct an entropion of the upper and lower lid as well as of the lateral canthus. A half-moon shaped piece of skin (arrow head - shaped at the lateral canthus) and orbicularis oculi muscle are removed adjacent to the lid margin. This leads to two wound margins that are unequal in length. To overcome this difference and avoid “dog ears”, wound closure is done by halving the tissue, when placing single interrupted sutures.

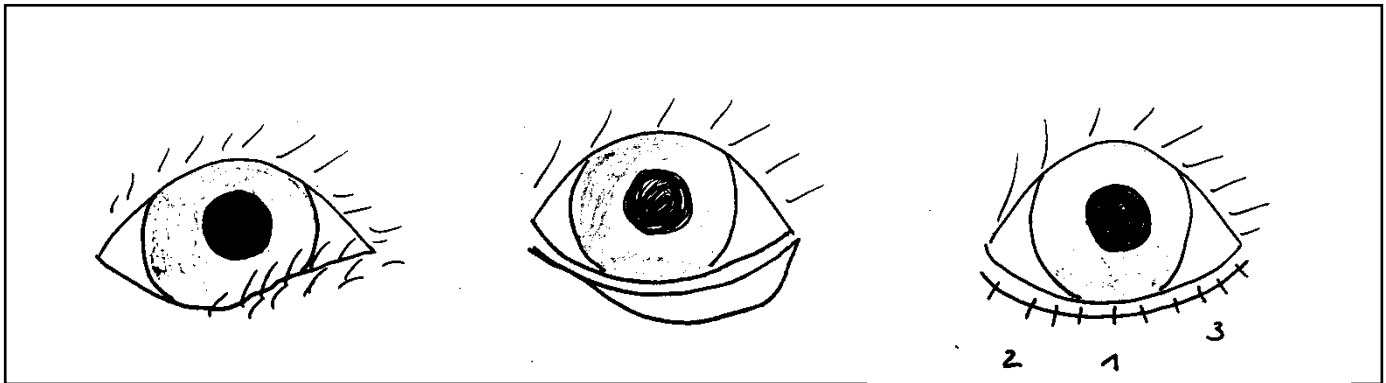


Figure 1: Celsus-Hotz technique for the correction of a lateral lower eyelid entropion

The Stades technique is a common technique for the correction of upper eyelid trichiasis in which excess and loose facial skin leads to hair irritating the ocular surface. Aim of this surgical technique is the creation of a hairless rim at the eyelid margin to reduce the risk of future trichiasis.

The initial incision is made directly at the lid margin to remove the haired skin including the hair roots. A second incision is done away from the lid margin, two centimeter or more at the widest aspect. The outlined skin is then removed with scissors. The haired skin is sutured to the subcutaneous tissue at the outer aspect of the tarsus (fibrous thickening in the eyelid) leaving 5- 7 mm of uncovered tissue at the eyelid margin. This partially open wounds heal with granulation tissue formation leaving a scarred and hairless rim at the eyelid margin which will reduce the risk of future trichiasis.

Alternatively, a face lift may be performed to correct an upper eyelid trichiasis. Particularly in patients where a loose face mask leads to reduced vision, this is a very helpful technique. Depending on the anatomical situation a stellate or elliptical piece of skin is removed. The anterior aspect of the facial skin is anchored to the periosteum of the sagittal crest using a monofilament and non-absorbable suture material. When closing the subcutaneous aspect of the wound bites of deeper tissue should be included to avoid pockets and reduce the risk of seroma formation. The skin is closed in a routine fashion. A face lift may be combined with the Stades technique, but this is recommended in separate sessions to assess the result of the first surgery before planning the second operation to avoid overcorrection of the problem.

Complication of eyelid surgery include under and over correction, wound infection, irritation due to rubbing suture material and adverse reactions to the suture material.

Temporary tarsorrhaphy

The temporary and partial closure of the eyelids may be used to protect the ocular surface for example following a proptosis, in the presence of neurological deficits and following corneal surgery.

The tarsorrhaphy may be placed medial or lateral depending on the anatomical requirements, however, it appears to be beneficial to leave the medial aspect of the palpebral fissure at least partially open to allow drainage of any secretion. Furthermore, the medial aspect of the cornea is usually well protected by the third eyelid.

Atraumatic suture material size 6/0 or 5/0 is recommended. For a shorter duration (e. g. after surgery) polyfilament suture material may be used as it is often more comfortable. For a longer stay monofilament, non-absorbable suture material may be chosen. It is important to closely adapt the lid margins and avoid suture material touching the ocular surface. This can be very irritating and lead to significant injury of the cornea. Using either simple or mattress sutures skin bites of about 5mm are taken. The needle leaves the lid margin at the level of the “grey line”, which is the line formed by the meibomian gland openings. The needle then enters the opposite lid margin again at the level of the grey line at the same distance to the closest canthus and another piece of about 5mm of eyelid skin is taken. For a mattress suture this is done twice to create a U-shaped suture pattern. For a tarsorrhaphy that will remain in place for several weeks, rather than days mattress sutures are preferred and the suture material can be supported with fluid tubing to disperse the pressure on the skin and avoid necrosis.

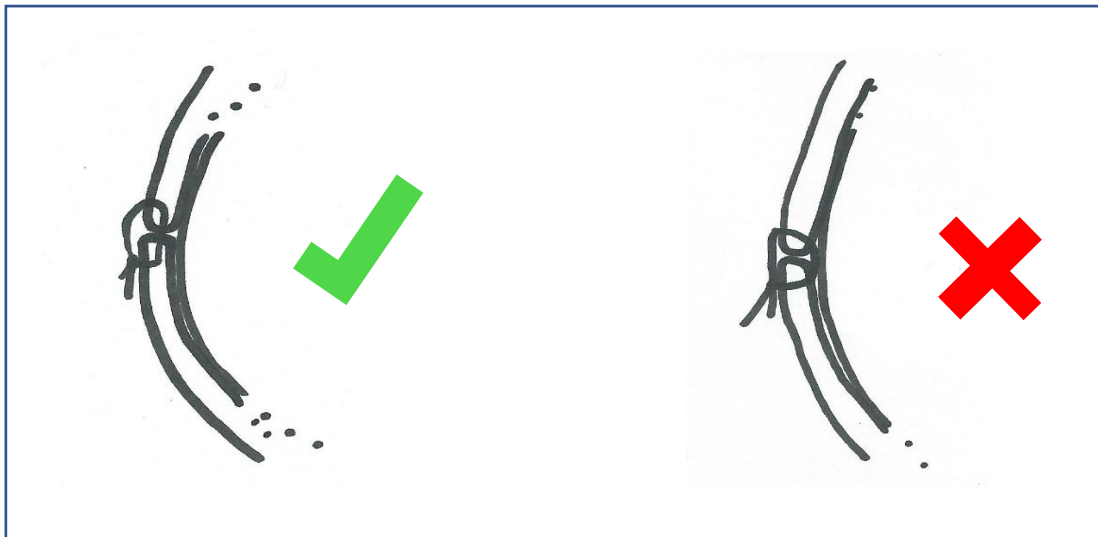


Figure 2: Correct and false placement of a temporary tarsorrhaphy, the suture material should remain at the level of the “grey line” and not touch the ocular surface.

Surgery of the conjunctiva

The conjunctiva is a mucous membrane which lines the inside of the eyelids. It allows movement of the eyelids, secretes the mucous part of the tear film (goblet cells) and plays a role in the immunologic protection of the eye. Surgical procedures of the conjunctiva should be performed with adequate magnification.

The conjunctiva is very elastic, which has to be considered when cutting the tissue. Its manipulation should be minimal and done with pair of small rat tooth forceps. It is best cut with scissors, not with a blade. The conjunctiva has excellent healing properties.

Conjunctival biopsy

A diagnostic sample of the conjunctiva may be useful in cases of chronic conjunctivitis or evidence of neoplasia and is possible following the application of a local anaesthetic agent. Important is the correct handling of the patient, which is held in a way that the upper eyelid is covering the globe and the assistant is pushing the globe through the upper eyelid into the orbit. This makes the third eyelid come up and protect the cornea. The conjunctiva is then exposed by pulling the lower eyelid down. The tissue to be sampled is lifted up with a small pair of rat tooth forceps and dissected with small scissors. The wound does not require suturing. Some bleeding is expected but usually stops within minutes. Topical phenylephrine eye drops 2.5% may be used to help with haemostasis.



Figure 3: Exposure of the third eyelid and lower conjunctiva for biopsy by pushing the globe into the orbit through the closed upper eyelid

Third eyelid flap

Third eyelid flaps are used to cover and mechanically support the cornea. While it is easily performed a big disadvantage is its lack of transparency which makes monitoring of the healing process almost impossible. Indications may be neurological deficits and the bullous keratopathy in cats. A third eyelid flap is contra indicated for melting or infected corneal ulcers. Alternative options to support and protect the ocular surface are bandage contact lenses and a temporary tarsorrhaphy.

When operating the third eyelid always avoid damage to the free margins as these will be permanent. The t – shaped cartilage is what gives the third eyelid its strength and should therefore be used for suture placement. Two single mattress sutures are used to attach the third eyelid either to the upper eyelid or the bulbar conjunctiva. Sutures at the upper eyelid should be supported to avoid tissue necrosis.

Reposition of the third eyelid gland

The third eyelid gland sits at the base of the third eyelid and produces up to 30 % of the aqueous component of the tear film. Since a prolapse leads to inflammation and reduced function a reposition should ideally take place within few days after the diagnosis. Reposition should always be attempted as the removal of the gland will predispose dogs to dry eye, particularly as the prolapse of the third eyelid gland is commonly affecting dogs that are predisposed for an immune mediated keratoconjunctivitis sicca.

Surgical techniques include the Morgan pocket technique and the tacking to the orbital rim.

For the Morgan pocket technique two incisions are made into the bulbar surface of the third eyelid. One 5-7mm away from the limbus and the second 5 -7 mm away from the free margin of the third eyelid. At the ventral aspect close to the globe a pocket is created at the medial aspect of the orbit via blunt dissection. By suturing the outer wound margins together, the conjunctiva is tightened above the gland, keeping it in position within. The created pocket. Knots are best kept on the palpebral surface of the third eyelid to prevent any contact with the cornea. Recurrence of the prolapse following surgery is commonly attributed to an inadequately tightened conjunctiva that stretches again or damage of the suture or conjunctiva due to inadequate handling during surgery.

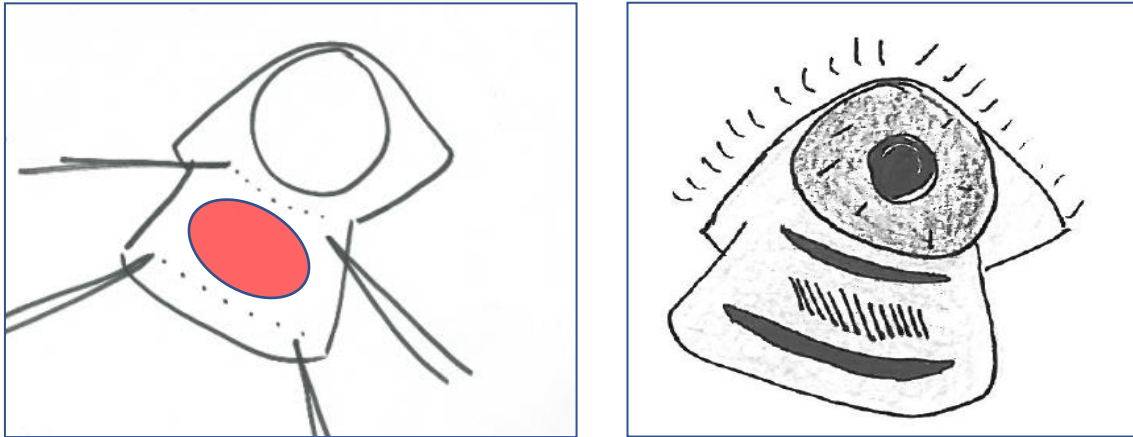


Figure 4: Positioning of the third eyelid with four small artery clamps for a Morgan pocket technique, positioning of the incisions at the bulbar surface of the third eyelid at either side of the third eyelid gland

Alternatively (or in combination with the Morgan pocket technique) the third eyelid gland may be fixed to the orbital rim. Given that this will reduce the mobility of the third eyelid this procedure is reserved for patients with a recurring problem or for broad headed breeds. The orbital rim is accessed through either the skin or conjunctiva. A monofilament suture (3/0 or 4/0) is then used to anchor the third eyelid gland to the orbital rim.

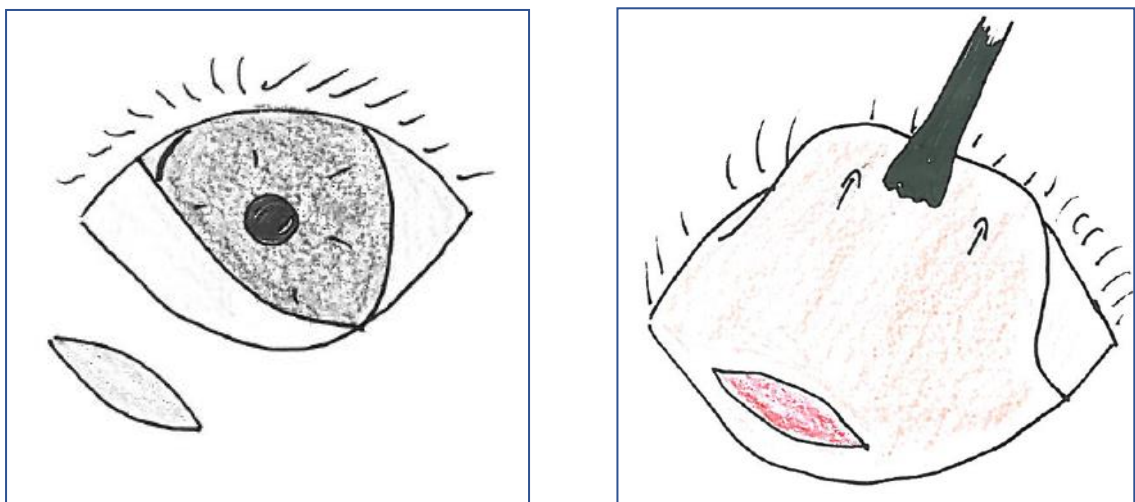


Figure 5: Tacking of the third eyelid gland to the orbital rim can be done through the skin or conjunctiva.

While several other techniques are described for the reposition of the third eyelid gland, techniques, where the gland is fixed to the globe or its adnexa (e. g. extraocular muscles) directly are better avoided, as they will result in a (even if mild) diversion of the globe position and must lead to diplopia.

Eversion or inversion of the third eyelid

An eversion or inversion of the third eyelid is caused by an atypically bent third eyelid cartilage. To correct this problem the bent part of the cartilage is surgically removed. Depending on the anatomical situation this may be done through the palpebral or bulbar surface of the third eyelid. Note that an eversion of the third eyelid may look like a prolapsed third eyelid gland or the two conditions may occur together. A prolapsed third eyelid gland may occur following the correction of an everted or inverted third eyelid cartilage. This should be carefully communicated with the patient's owners to avoid frustration.

For the correction of this condition the conjunctival surface above the bent tissue is incised. The cartilage is exposed and freed, and the bent part excised. Depending on the surgical situation suturing of the conjunctiva may not be necessary. The third eyelid should now lie in its natural position. If this is not the case wound closure or fixation sutures may help to bring the third eyelid into a natural position which is then maintained following wound healing.

Conjunctival graft

A conjunctival graft describes the transposition of conjunctival tissue into the cornea. This provides instant vascular supply which is particularly useful for fungal infections and melting ulcers.

Conjunctival grafts may also benefit patients with an endothelial dysfunction (Gunderson flap). Nonetheless the mechanical support of conjunctival grafts is limited, and the covered tissue will remain opaque. Depending on the type of conjunctival advancement there are:

- Conjunctival pedicle graft
- Conjunctival bridge graft
- Conjunctival hood graft
- Gunderson flap (double hood graft)

For ocular surface surgery the eye should be centrally positioned. If the use of neuromuscular blocking agents is not possible the eye position can be adapted with "stay – sutures". 6/0 suture

material is anchored to the perilimbal conjunctiva. The bite of tissue needs to be sufficient to avoid tearing, but a penetration of the globe has to be avoided.

For better exposure of the globe one may consider a lateral canthotomy, however this may damage the conjunctiva at the lateral canthus which may make surgery more difficult. The preparation of the graft should be done from an area that is easily accessible (the third eyelid is best avoided). However, the surgeon should always consider how the visual axis is kept as transparent as possible so that the patient's vision is maintained as much as possible. Before the graft is sutured into the ulcer bed, the latter should be debrided. It is important to remove any down growing epithelium and to remove infiltrated cornea that may give rise to further tissue destruction and subsequent wound dehiscence. The graft is then positioned into the defect with cardinal sutures. It is essential that at this stage no tension lies on the graft. The graft is then sutured into position with single sutures or a continuous suture pattern. Conjunctival grafts may be combined with a temporary tarsorrhaphy to provide protection during the healing phase. Reasons for failure of conjunctival pedicle grafts may be:

- Graft under tension
- Epithelial downgrowth
- Movement to the graft (i. e. attachment to the third eyelid)
- Poor vascular supply (base too thin)
- Degradation of the cornea (infection, melting process)
- Perforation under the graft

Surgery of the nasolacrimal system

The easily accessible parts of the nasolacrimal system are the lacrimal puncta and canaliculi. A malfunction of the system will lead to epiphora without any signs of discomfort. The puncta may be too small (micropuncta) or the openings to the canaliculi may be missing completely (atresia of the lacrimal puncta).

In both cases it is possible to identify the too small puncta or missing openings with help of a slit lamp. Flushing of the system may also help identifying the impermeable opening. A recreation of the puncta is done using the "1 – 2 – 3 snip technique" with a small pair of scissors. The openings usually remain open. Stents only tend to be necessary if the canaliculi are missing and need to be created or if significant damage to the canaliculi occurs.