

CONJUNCTIVAL GRAFTING: DO IT RIGHT!

Simon Petersen-Jones, DVetMed, PhD, DVOPhthal, MRCVS, DECVO
Department of Small Animal Clinical Sciences, Michigan State University, East Lansing, MI

Key Points:

- Conjunctival grafts are useful for providing support to deeper corneal defects
- Most commonly used for deep corneal ulcers
- Etiology of ulcers needs to be considered (requires complete eye examination)
- Possible presence of infection and melting of the corneal ulcer needs to be monitored

Conjunctival grafts, free or more usually attached, are very useful for the management of serious sight threatening corneal ulcers and can be readily performed using a minimum of specialized equipment.

Indication for conjunctival grafts

Conjunctival grafts are usually reserved for the treatment of corneal ulcers that are deeper than one half of the corneal thickness or where satisfactory healing without surgical intervention is unlikely. They offer very significant advantages over techniques such as third eyelid flaps and tarsorrhaphies. They:

- provide support for weakened cornea
- provide an immediate blood supply to the ulcer (except for free grafts)
- provide antiproteases and antibacterial substances
- with the exception of total conjunctival flaps, continued visualization of the cornea and intraocular structures is possible
- are readily performed and highly successful

The main disadvantage of their use is the resulting area of corneal opacity at the ulcer site, however this is a minor drawback compared to the risks of corneal perforation and loss of the eye if grafting is not performed.

Any animal with a corneal ulcer should have a complete eye examination. Potential causes of, or contributory factors to, the ulcer should be identified. This may include lid defects, abnormal cilia, foreign bodies, tear film abnormalities such as dry eye, inability to blink properly, injuries, infections. Management of the ulcer may include correction of any predisposing cause. With an ulcer severe enough to warrant grafting samples from the ulcer edge should be taken for culture and sensitivity and cytology. Cytology is used to give a rapid indication of the presence of bacteria. Typically a quick stain such as Diff Quik is used on one of the smears. If organisms are seen a Gram's stain should be performed on another slide. Appropriate topical antibiotics can be selected based on the staining results.

Types of graft

The selection of graft depends on the extent and position of the ulcer and the health of the surrounding cornea (for suture placement). The most versatile and useful graft is the pedicle graft which can be used on large and even perforated ulcers. Other patterns of conjunctival graft include; bridge, hood and total grafts and free island grafts.

Instrumentation

- Magnification and good illumination
 - Magnifying loupes or an operating microscope are suitable
- Lid speculum
- Forceps – both conjunctival (Bishop Harmans are suitable) and corneal forceps (e.g. Castroviejo 0.12 forceps) are required
- Fine blunt tipped tenotomy scissors
- Microsurgical needle holders are required
- Suture tying forceps – if desired. Castroviejo 0.12 forceps have a tying platform that can be used.

Applying a Conjunctival pedicle graft

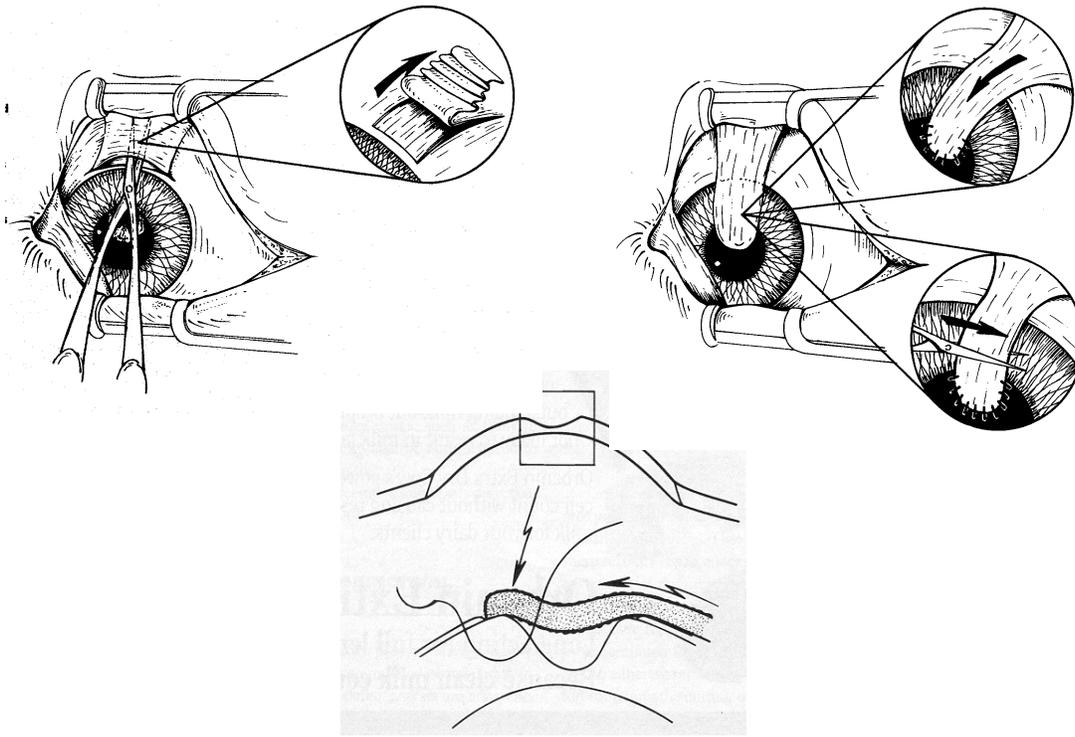
Prior to placement of the graft the ulcer site should be gently cleaned or debrided to remove necrotic corneal stroma. Any corneal epithelium which has started to grow down into the depths of the ulcer crater should be removed, taking great care with manipulations at the depth of the ulcer. Failure to remove the epithelium could result in the conjunctival graft detaching from the ulcer site. A smooth edge to the corneal defect will likely indicate that epithelium is growing into the defect. Fluorescein stain will confirm this – it will not pass through intact epithelium. Conjunctival flaps or grafts should be fashioned so that they are as thin as possible – predominantly involving the epithelium and not deeper structures such as tenon's capsule.

Conjunctival pedicles may be fashioned either by dissecting a pedicle of conjunctiva from bulbar conjunctiva parallel to the limbus and then rotating it onto the cornea (a rotation pedicle), or by dissecting a pedicle at 90° to the limbus which extends into the fornix and then is advanced over the cornea (advancement pedicle). Whichever approach is used the graft should be slightly wider than the defect and be able to reach and cover the defect without being under tension.

To start the graft dissection an initial conjunctival incision is made adjacent to the limbus. From this starting point the conjunctiva is undermined. The dissection is made at a single plane under the epithelium. Blunt tipped fine tenotomy scissors are used for a predominantly blunt undermining of the conjunctiva. It should be possible to visualize the scissors through the conjunctiva. Care should be taken not to "button-hole" the epithelium. The epithelium tends to roll up on itself during dissection. If an advancement type pedicle is fashioned the conjunctiva towards the fornix becomes more difficult to dissect from the deeper structures. Despite this care should be taken to keep the graft thin. For the advancement pedicle slightly diverging incisions are made through the conjunctiva extending away from the limbus to fashion the finger shaped flap. A lid speculum is useful when initially removing epithelium from the ulcer but will impede development of an advancement flap. Stay sutures can be used in the conjunctiva adjacent to the limbus to manipulate the globe as required. Once the flap can be placed to cover the corneal defect without being under tension it can be sutured into place. Simple interrupted sutures are used. Sutures at the two sides of the distal tip of the pedicle are placed first. These should stretch the pedicle to cover the defect. The suture is placed through the pedicle graft first and then into the cornea. Additional simple interrupted sutures are placed to the distal edge and two sides of the pedicle to the corneal defect. The sutures should be placed approximately 3/4s of the depth of the cornea – avoid penetrating full thickness. When suturing into an ulcer crater this can be achieved by having the sutures pass into the walls of the crater, ensuring they pass into

relatively healthy cornea. The suture material is typically fine and absorbable – 8/0 Vicryl is suitable.

Figure 1. Diagram of an advancement conjunctival pedicle graft



After placement of the graft the conjunctiva will heal into the ulcer site and provide a good blood supply to encourage corneal healing. After about 3-4 weeks the graft may be trimmed. Conjunctiva should be left over the deep part of the ulcer to act as a plug for the defect to confer strength to the weakened cornea. Over the subsequent months some degree of remodeling of the remaining graft will occur.

After 4 - 6 weeks the graft should have healed in place repairing the corneal defect. The graft is then cut just above the ulcer site and the conjunctival pedicle left to retract and remodel. A piece of conjunctiva will have been left in situ within the ulcer site. This will atrophy in time leaving a corneal scar.

Post-operative care

An Elizabethan collar is fitted and remains until the graft has healed well into place. Appropriate topical antibiotic is provided. This can be selected on the basis of the Gram staining of smears from the ulcer until the culture and sensitivity results are available. Systemic non-steroidals may also be provided for the first few days.

Common reasons for graft failure

- Epithelium that has grown down into the ulcer site is not removed. This can often be peeled off with corneal forceps. The conjunctival graft will not heal to an epithelialized surface.
- Graft under too much tension. The graft may retract and the sutures pull out if the graft is not adequately dissected to ensure it is not under tension.
- Melting cornea. If proteases and collagenase are being released resulting in a melting ulcer it may continue to melt meaning the sutures are not longer in intact cornea.