

BASICS OF SURGERY NEAR THE EYE

- A. Ophthalmic Instruments** - Designed to be handled by the fingertips. Sharp, precision instrumentation, adequate lighting and magnification are essential. Ophthalmic instruments are easily damaged and quickly become worthless unless properly handled. Essential instruments include:

1. Derf needle holders
2. Steven's tenotomy scissors (curved)
3. Barraquer's wire lid speculum (adult)
4. Bishop-Harmon forceps (delicate 1x2 0.3 mm teeth)
5. #3 Bard-Parker scalpel and #15 blade
6. Optivisor head loupes 5x
7. Adson 1x2 forceps with delicate teeth

Additional supplies include cotton tipped applicators, tongue depressors or Yaeger lid plates, drapes, towel clamps, suture material, irrigation cannulas, Mayo scissors, thumb forceps

B. Instrument Care

1. **Storage:** Store in a separate pack and individually sterilize/wrap. If wrapped together, do not allow them to rub against each other. Various specialized instrument trays are available.
2. **Cleaning:** Ultrasonic cleaning followed by air drying is best. Inadequate cleaning results in rust, which can be removed by soaking for 12 hrs in equal parts ethyl alcohol and aqueous ammonia.
3. **Sterilization:** Gas sterilization is best. Steam autoclaving may be used but may cause corrosion and dull instruments. **MOST DULLING AND CORROSION IS DUE TO IMPROPER CLEANING AND HANDLING.** Small sections of silicone tubing may be slipped over the tips to prevent their being damaged during sterilization. Cold sterilization is not recommended.

D. Anesthesia

1. Traction on extraocular muscles occasionally incites an oculocardiac reflex, bradycardia or even cardiac arrest. This is most often seen in brachycephalic dog breeds.
2. In anesthetized animals, corneal damage may occur secondary to impaired palpebral reflexes, decreased tear production, and lagophthalmia. Un-operated eyes should be lubricated.

E. Patient and Surgeon Positioning

1. **The Patient:** The animal is usually placed in lateral recumbency with the head close to the end of the table. Ideally, if magnification is used, the palpebral fissure would be parallel to the ground so that all of one level of the eye (lids, cornea, or lens) will be in focus in the same plane and surgeon movement required to restore focus will be minimized.

2. **The Surgeon:** Sit at the head of the table and rest your forearms on the edge of the surgery table (not the patient).
- F. Patient Preparation** - Differs slightly with procedure, but in general:
1. Elevate the down eye off the table by placing a rolled towel under the neck to prevent it from contacting the table or a pool of Betadine that has run off from the other eye. Also, be careful to not let Betadine used in preparing the up eye run directly into the down eye.
 2. To avoid excessive lid and conjunctival edema, BE GENTLE. All antiseptic preparations are toxic to intraocular structures, and should not be used to flush the conjunctival sac if the corneal/scleral shell has been breached.
 3. Carefully clip an appropriately sized border around the margins of the lids using scissors coated with K-Y Jelly or a #40 blade on an electric clipper. Removing the hair at the skin line is not necessary and can cause undesirable trauma. The lashes may be trimmed with scissors lightly coated with K-Y Jelly.
 4. Gently blot with tape to pick up any remaining loose hairs.
 5. Conjunctival Sac: Alternate wipes of dilute (1:1 to 1:10) povidone iodine solution with flushes of sterile saline. Sterile cotton tipped applicators should be used to apply the povidone iodine taking care not to touch the cornea. The fornix should be swabbed first working out toward the eyelid margins. Rinse immediately with saline. Repeat 2 more times.
 6. The periocular skin may be prepared by gentle alternate applications of dilute (1:1 or even 1:10) povidone iodine solution and sterile saline. Avoid chlorhexidine it causes a severe toxic keratitis. Gauze placed between the eye being prepared and the down eye is needed to prevent antiseptics from coming in contact with the down eye. Work from the eyelid margins outward.
- G. Postoperative Care** - Narcotics or NSAIDs may be used for analgesia. Elizabethan collars are needed in most small animal ophthalmic patients post-op.

ENUCLEATION

- A. Indications** - A painful and medically/surgically nonresponsive ocular condition or an inoperable intraocular neoplasm.
- B. Presurgical Considerations**
1. An enucleation is done when the condition is confined to the globe. If there is orbital extension an exenteration should be performed. Exenteration is the complete removal of all tissues within the orbit.
 2. If an orbital implant is placed the wound must be closed meticulously and in 3 layers. The rejection rate of the sphere is 2-4% in dogs and higher for cats (up to 10%?).
- C. Technique - Modified Transpalpebral Enucleation** - Removes the globe, a short piece of the optic nerve and all glandular tissue except the lacrimal gland, e.g. lid margins with the meibomian glands, conjunctiva with goblet cells, the third eyelid and its gland.
1. **Antibiotics** - 20 mg/kg cefazolin (1/2 IV, 1/2 IM) at induction.
 2. **Preparation** - The eyelashes are trimmed with scissors coated with K-Y Jelly so the hairs will not fall into the eye. Clippers are used to trim all the

hair for 2-3 inches around the eye. Try to save the animal's "whiskers". If necessary, a shave with a #10 Bard-Parker scalpel blade for about 1-2 cm around the eye at the eyelid margins will help remove some of the finer hairs on the muzzle which cannot be removed with clippers. Tape may be used to pick up fine hairs that remain after clipping.

Gently prep with either Betadine scrub or dilute Betadine solution (50:50 with saline) followed by saline or eyewash rinses (not alcohol). Work from the globe outwards and prepare the conjunctiva (bulbar and palpebral), lids and periocular area. Cotton tipped applicators can be used to swab out the conjunctival cul-de-sac. Since the eye is going to be removed one need not be concerned about betadine scrub getting into the eye. You should, however, protect the down eye from trauma from the table top and run-off betadine. A rolled towel under the animal's neck to elevate the head off the table, and a gauze square between the 2 eyes during the prep to collect run-off can be helpful. The periocular area is prepared until the area is free of dirt and extraneous hair.

One additional preparation using betadine solution can be done after the animal has been positioned on the table.

Positioning of the animal on the surgical table should be so the palpebral fissure is parallel with the table top. Sand bags, Vac-Pacs and/or towels are helpful.

3. Surgical Procedure

Some surgeons suture the eyelids closed if the ocular surface is infected to try to minimize the risk of contamination of the orbit during the procedure. A #15 Bard-Parker scalpel blade is then used to make a full-thickness skin incision about 2- 5 mm from the lid margin for 360° around the eye. Incisions wider than this risk severing the angularis oculi vein near the medial canthus. A combination of blunt and sharp dissection is used to separate the skin, subcutaneous tissues and orbicularis muscle down to the stroma of the conjunctiva. Care must be taken to avoid incising through the conjunctiva. If this occurs, simply grasp the margin on the globe side and continue.

The medial canthal ligament and the retractor anguli oculi muscle (felt as firm bands in the medial and lateral canthus respectively) are then transected with a scalpel and the gland of the third eyelid is seen bulging medially. A curved mosquito forceps or pair of scissors is used to develop the plane between the gland of the third eyelid and the orbital rim so as to ensure the gland is removed with the globe.

The development of this dissection is continued all the way around until all of the conjunctiva has everted to the limbus. Excessive traction on the globe may stimulate the oculocardiac reflex, especially brachycephalics and horses, and can traumatize the optic chiasm and the other optic nerve.

When the limbus is reached, the dissection continues to the sclera and the tendons of the rectus muscles and then those of the retractor muscles are transected with a tenotomy scissors or other suitable small scissors.

A curved Kelly or mosquito hemostats are used to clamp the nerve a few mm distal to the posterior pole of the globe. Special care needs to be taken to insure that the posterior pole of the globe won't be incised thereby allowing intraocular contents to enter the orbit. Once the nerve is clamped, the scalpel blade or scissors are directed flat and tight along the top surface of the forceps to sever the nerve. Usually now the globe can be lifted out and any extraneous tissues severed.

Hemostasis is achieved by several minutes of digital pressure through a gauze, ligation and/or cautery. Minor bleeding during the surgery is ignored. These small bleeders usually stop on their own

4. **Closure** - Normally a 3 layer closure

The periorbital/lid fascia (an extension of the periorbital) is closed with a simple continuous absorbable suture starting by inverting the knot. The periorbital can be identified by grasping the firm tissue near the orbital rim and pulling it across the orbital opening. Regrasp away from the rim and pull outward until it is clear where the outer extent of the periorbital lies. If this is not done then success at forming a complete closeable diaphragm is less likely. If insufficient periorbital remains, as is common following an exenteration, the deep subcutaneous tissue is closed instead.

A tight diaphragm should be made without gaps. If there are any gaps and additional simple interrupted or horizontal mattress stitch can be placed to close the gap. The subcutaneous tissue is closed routinely with absorbable material (frequently a subcuticular pattern is used) and the skin with a fine (4-0) nonabsorbable material in a simple interrupted pattern. If an implant is used the closure must be meticulous in all 3 layers (without gaps) and you should strive to get as much tissue over the sphere as possible.

D. Postoperative Care

1. Treatment with a systemic broad spectrum antibacterial is used if the eye was infected. If an orbital prosthesis was implanted systemic antibiotics are used for 7-10 days postoperatively.
2. An Elizabethan collar is generally unnecessary.
3. Post-op swelling tends to be the greatest at 24-48 hours. Usually by 72 hours a noticeable decrease in swelling should occur. Over the next one to three weeks the area will become depressed to a variable degree if an implant was not placed. Any return of swelling or drainage once the initial swelling begins to subside would indicate a problem (infection, seroma, retained secretory tissue - not lacrimal gland in my experience - but gland of third eyelid, conjunctiva, suture reaction, hemorrhage or tumor that was missed).
5. Post-op seromas may be slightly more likely with the subconjunctival approach for enucleation, but even in this case they are uncommon.
6. Skin sutures are removed usually in 8 to 10 days.
7. The excised tissues should be submitted for histopathology.