Injury to ocular adnexa is a commonly encountered by ophthalmologists in day to day practice. So it is very important to know about basic rules of eyelid repair so that both cosmetic appearance and physiological function could be preserved.

**Basic Considerations**

1. Careful history about mode and time of injury is very important. Mode of injury may tell you about possibility of deep penetration into the orbit or any intraocular foreign bodies. History of alcohol use, any medico legal issues are worth mentioning in history. Also ask about any previous systemic illness and timing of last oral feed to plan for general anesthesia.
2. Assess general condition of patient to rule out any multi system trauma especially any head injury which may be a priority to attend.
3. Record visual acuity of each eye.
4. Thorough examination of eye to rule out any globe injury/occult perforation. Any RAPD should be specifically looked for.
5. Appropriate radiological investigations to rule out any intraocular foreign bodies, injury to optic nerve. CT scan is preferable if any magnetic intraocular foreign bodies are suspected. MRI is the preferred choice in suspected optic nerve injury.
6. Counseling is very important to build up rapport with patient and relatives. Extensive trauma may need multistage repair about which should be explained in detail to patient and bystanders to rule out future discontentment.
7. Take pre-operative photographs to document extent of injury which may be important to explain to patient and from medico legal point of view.

**Anaesthesia:** Majority of lid lacerations can be repaired under local anaesthesia. Facial block can be supplemented. However extensive injuries which need considerable time for reconstruction should preferably be under taken under general anaesthesia. Injection of anesthetic mixture may distort the local anatomy and prevent correct approximation of wound edges.

**Wound toileting** is very important. Irrigate the wound thoroughly of all debris. Foreign bodies should be picked up with forceps.

**Supportive Treatment:** Systemic antibiotics should be started. Intravenous antibiotics are preferable for severely contaminated wounds. Tetanus toxoid and or Tetglob can be given to non-immunized patients. It is not required for children who have keen vaccinated earlier including booster dose. Systemic steroids can be given to reduce edema and inflammation if there is no contra indication.

**Classification and Management**

Good vascular supply of fascial tissues rarely necessitates extensive debridement as these tissues heal very well. Following are the most common type of eyelid trauma encountered in daily practice and their management.

A. **Eyelid margin repair**

Eyelid margin lacerations require precise suture placement and critical suture tension to avoid notching of eyelid margin which can disrupt tear pump function post-operatively (Figure 1).

It can be accomplished by 2 or 3 sutures for alignment through lash line, meibomian gland plane and gray line and keep ends long to be incorporated in subsequent skin sutures. (Figure 2)
6.0 silk is an ideal suture for eyelid margin and skin closure. Closure should result in moderate eyelid margin eversion of well approximated wound edges. Tarsus is sutured with absorbable 6.0 vicryl sutures. Tarsal sutures should never extend full thickness through conjunctival surface especially in upper lid to avoid corneal epithelial disruption. One must protect globe with lid guard well lubricated with antibiotic ointment to prevent inadvertent needle point injury while repair.

B. Lacerations not involving the lid margin
Superficial eyelid lacerations involving just the skin and orbicularis muscle require only skin sutures. To avoid cosmetically unacceptable scar, consider basic principles of repair like conservative debridement of wound, use of small caliber sutures, eversion of wound edges and early suture removal. As a rule, conjunctiva and orbital septum are not sutured while any lid repair is done. Conjunctiva will be in good approximation if levator and tarsus are correctly re-approximated. Any orbital fat visible indicates violation of orbital septum and need levator exploration. (Figure 3a, 3b)

Figure 3a Eyelid laceration with orbital fat prolapse
Figure 3b. Four months postoperative appearance

Orbital septum should never be reattached as this may result in restrictive ptosis or lagophthalmos. Septal attachments between orbital rim and levator should remain completely open as contraction of septum during healing phase is uncontrolled and may lead to restriction of levator muscle. Leaving septum open also allows easy egress of orbital haemorrhage and may prevent orbital injury due to postoperative swelling and bleeding.

C. Eyelid Avulsion and Canthal Injuries
It is usually the result of horizontal traction on eyelid which causes avulsion at lid’s weakest points medial or lateral canthal tendon. Avulsion at medial canthal area demands evaluation of lacrimal drainage system. Canicular injury should be specifically looked for and repaired as discussed later. Medial canthal tendon (MCT) avulsion will cause rounding of medial canthal tendon and acquired telecanthus.

Treatment of MCT avulsion depends on nature of avulsion. If upper or lower limb is avulsed but posterior attachment of the tendon is intact, avulsed limb may be sutured to its stump or to the periorbital overlying anterior lacrimal crest. Posterior portion of MCT attached to posterior lacrimal crest needs special attention as this portion mainly gives stability to medial canthus. Inability to realize this can lead to medial canthus deformity and improper apposition of eyelid margin to globe. (Figure 4)

Figure 4: Improper apposition of lid margin to globe due to failure to fixate posterior portion of medial canthal tendon. Mini monoka stent can be seen in situ in lower canaliculus.

If entire tendon including posterior part is avulsed, avulsed tendon has to be reattached to post lacrimal crest. If there is associated nasoorbital fracture, transnasal wiring or plating is needed after reduction of fracture. Non-absorbable 6.0 or 4.0 prolene sutures are the choice for canthal injuries. Absorbing sutures do not have the tensile strength for this type of trauma repair.

Lateral canthal tendon has to be reattached to lateral orbital rim using non-absorbable prolene sutures. Sharp contour of lateral canthal angle has to be kept in mind while reconstruction.

Avulsion injuries accompanied by tissue loss need reconstructive surgery at a later date. The initial goal is to stabilize eyelid and protect the eyeball. Tarsorrhaphy can also be considered till patient gets access to oculoplastic surgeon.
trained in reconstructive procedures.

D. Canalicular laceration

All canalicular lacerations need to be repaired whether upper or lower. One should have a high index of suspicion for any injury involving medial canthus. It is not uncommon to see such injuries even with a trivial trauma (blouse hook injury to child while breast feeding).

Surgical Technique

Repair has to be undertaken under operating microscope preferably under general anaesthesia. Identification and retrieval of proximal end of canaliculus is a real challenge. (Figure 5)

Gentle traction at edges of wound with cotton applicator stick under high magnification will help. If it is difficult to identify, gentle irrigation of fluid or air injection through uninjured canalicular system can help in identification. Diluted fluorescein can also be injected to visualize canaliculus. Dyes like methylene blue can cause staining of tissues so better to be avoided. Use of pigtail probe has a high incidence of damage to uninvolved canalicular system especially in inexperienced hands. If proximal end cannot be retrieved, eyelid should be closed without further manipulation.

After identification of cut ends, canaliculus has to be stented using either monocanalicular or bicanalicular (Crawford) stents. Minimonoka monocanalicular stents are now available with excellent post-operative results. It has self retaining cap which sits at punctum giving it excellent stability and avoids extrusion or displacement of stent. (Figure 6).

It also has advantage of not disturbing uninjured canaliculus (Figure 7).

Figure 7 Mini monoka stent in situ upper canaliculus

Only disadvantage is the high cost of stent. If nothing is available, Angiocath I/V cannula 22 gauze can be used to stent canaliculus. (Figure .8a, 8b, 8c).

Figure 8a Bicanalicular laceration in a young boy following trauma with a sharp object

Figure 8b Postoperative 5th Day, lower lid mini monoka stent in situ and in upper lid Angiocath 22 gauge IV cannula used to intubate canaliculus.
After stenting, cut ends of canaliculus have to be sutured. One should not pass sutures through lumen of canaliculus, only pericanalicular tissues need to be approximated using absorbable vicryl sutures. Ideally stent should remain in place for 2 months. Patient should be instructed not to rub eye or pull the tube in medial canthus.

**Traumatic Ptosis**

It may be seen both with lid lacerations and with contusion injuries. Traumatic Ptosis following contusion usually improves almost fully spontaneously. So it is advisable to observe till 6 months before undertaking any repair. Exception to this rule may be young children in whom little early intervention can be considered to prevent deprivation amblyopia. Laceration of levator muscle or its aponeurosis need exploration and repair during primary surgery itself.

**Dog Bites**

More common in children. Initial management involves copious irrigation and cleaning of wound. Immunoglobulins can be injected locally around wound. Rabies and tetanus prophylaxis should be observed. Systemic antibiotics are also recommended. Definite repair should be undertaken only after 24-48 hours to allow for local Immunoglobulins to act. Early intervention without any rabies prophylaxis can lead to spread of rabies virus causing more damage.

**Summary**

Repairing eyelid and canalicular injuries need patience and skill on part of the surgeon. The foremost rule is to never hurry up a closure. Maximal possible reconstruction should be done during primary repair itself. Repairing these tissues is rarely emergency and often one can wait for careful intervention performed by some one intimately familiar with anatomy and reconstruction of these structures. Improper primary repair can have significant and lasting visual and cosmetic side effects.

**References:**

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