Emergent Evaluation of Eyelid Lacerations

A guide for ophthalmology residents

Thomas J.E. Clark, MD; Erin M. Shriver, MD, FACS
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Step 1: ALWAYS clear the globe

Step 2: History

A. Patient age
B. Mechanism of injury
    1. What type of object inflicted the injury?
        a. Dog bites:
            i. Recommend the dog be put down as the second bite is many times worse than the first
            ii. Give antibiotics covering mixed flora (e.g. Streptococcal spp., Anaerobes, Pasteurella, and gram negative rods (GNR))[1]:
                - Ampicillin/Sulbactam (Unasyn®): 1.5-3gm IV q6h [adults], 150-300mg/kg/d IV divided q6h [pediatrics]
                - Amoxicillin/Clavulanate (Augmentin®): 875mg/125mg PO bid [adults], 25mg/kg/d PO divided bid [pediatrics]
                - Meropenem: 500mg IV q8h [adults] with dose adjustment for CrCl <51mL/min, 10mg/kg (max dose: 500mg) IV q8h [pediatrics]
                - Moxifloxacin: 400mg IV or PO qd [adults], contraindicated in pediatrics
                - Clindamycin (misses GNR and Pasteurella): 600-900mg IV q8h or 300-450mg PO q6h [adults], 20-40mg/kg/d IV or 8-16mg/kg/d divided in 3 or 4 equal doses [pediatrics]
    2. Is there a potential for retained foreign body (metal vs organic material)?
C. Time lapse since injury occurred
D. Last oral intake
E. Last Tetanus shot (see Tetanus Vaccination Protocol below)

Step 3: Exam

A. Take a picture
B. Look for ***RED FLAGS*** that warrant Oculoplastic involvement
    1. Visible orbital fat (signifies septal violation concerning for damage to deeper structures)
    2. Laceration of the eyelid margin (requires meticulous closure to avoid long-term sequelae from lid margin notching)

3. Damage to the lacrimal system (shearing forces commonly damage the medial canthal structures) – may need to probe and irrigate to rule out canalicular involvement
    a. Supplies needed for lacrimal system probing and irrigation:
        a. 4% topical lidocaine
        b. Cotton-tipped applicator
        c. Punctal dilator
        d. Bowman probe (size 00 or 0)
        e. 23-gauge curved lacrimal cannula on a 3cc syringe filled with fluorescein-infused saline *(this can be created with saline and a standard fluorescein strip)*

Step 4: Repair

A. Obtain consent
B. Take a photo
C. Obtain necessary materials:
    1. Lidocaine (1% or 2% with 1:100,000 epinephrine)
    2. 20- and 27- or 30-gauge needles [draw with 20-gauge, administer with 27- or 30-gauge]
    3. 3mL or 5mL syringe
    4. Sterile saline with irrigation tip
    5. 5% Betadine (Povidone-iodine)
    6. 0.5% topical proparacaine drops
    7. Castroviejo needle holder
    8. Paufique forceps
    9. Suture (5-0 or 6-0 Fast vs 7-0 Vicryl vs 7-0 nylon)
    10. Straight scissors
    11. Sterile gloves
    12. Mask
    13. Erythromycin ointment
    14. Sterile eye drape
    15. Sterile gauze and cotton-tipped applicators
    16. Mayo stand and sterile drop cloths, if available (if not, can set instruments and supplies on the opened sterile gloves wrapper)
D. Anesthetize
E. Explore
F. Irrigate with copious amounts of sterile saline
G. Anti-sepsis: prep with 5% Betadine *until the tissue bleeds*
H. Prepare a sterile surgical field utilizing a Mayo stand with sterile drop cloths (can then open and arrange instruments and suture), sterile gloves, mask, and sterile drape
I. Close the wound
    1. General principles [2]
        a. Tissue is almost never missing
        b. Strive for tension-free closure to avoid lagophthalmos/exposure keratopathy

c. Unless completely unavoidable, avoid making vertically-oriented suture passes as closing a horizontally-oriented wound with vertically-oriented suture passes can cause vertical cicatrization resulting in ectropion/lagophthalmos/exposure keratopathy
d. Cicatricial changes pull the lower lid down—attempt to elevate the lower lid as much as possible during repair (in cases of unavoidable vertical tension, a frost suture or temporary tarsorrhaphy may need to be placed)
e. *NEVER* suture the orbital septum

2. Suture selection considerations
   a. Patient expectations regarding scarring
      i. If aesthetics are important to the patient and the patient is able to return to clinic in order to have the sutures removed, non-absorbable monofilament sutures (e.g. nylon or prolene) are preferrable
   b. Patient reliability for follow-up
      i. Avoid non-absorbable sutures in patients unlikely to return for removal
   c. Amount of tension
      i. Braided sutures are superior for wound closure under tension
   d. Complexity of laceration/necessity of both deep and cutaneous closures
      i. Use 5-0 or 6-0 Vicryl for deep closures
3. Suturing technique
   a. Simple, interrupted closure is sufficient and preferable in most cases
      i. Divide the wound in half with the first suture pass, then continue to halve the remaining unclosed wound segments
   b. For extensive lacerations, a running closure is more expedient
   c. Can use a combination of interrupted and running closures, with interrupted sutures placed at points of tension and locations where the laceration changes direction

J. Apply erythromycin ophthalmic ointment to the wound
   1. If the patient has an erythromycin allergy, can use bacitracin ointment or Polysporin® (bacitracin + polymyxin B) ointment

Suture	Absorbability	Filament Type	Advantages	Disadvantages
5-0 Fast Gut	absorbable (1 week)	Mono	infection less likely	more difficult to handle, highly inflammatory
7-0 Vicryl	absorbable (4-6 weeks)	Braided	easy to handle, least inflammatory of absorbable sutures	infection and suture granuloma more likely
7-0 Nylon	non-absorbable	mono	least inflammatory, best aesthetic outcomes, infection less likely	requires follow-up for removal

**Table adapted from Lee & Carter, 2006 [3]*

Step 5: Post-closure cares/follow-up

A. Apply erythromycin (vs bacitracin vs Polysporin®) ophthalmic ointment to the wound TID
B. Arrange follow-up in Oculoplastics clinic within 10 days
C. Remove sutures (if Vicryl or nylon were used) 6-10 days post-operatively

Step 6: Wound management/scar maintenance

A. Avoid direct sunlight exposure for at least 6 months
B. *Once wound is healed…* MASSAGE, MASSAGE, MASSAGE
    1. 20 strokes TID
    2. Topical vitamin E or Mederma®

Tetanus Vaccination Protocol				
	Clean Knife Wound		All other wounds	
History	Tet Vac	Tet Ig	Tet Vac	Tet Ig
< 3 doses	Y	N	Y	Y
≥ 3 doses	if ≥ 10 yrs since last Tet Vac	N	if ≥ 5 yrs since last Tet Vac	N

***Tet Vac**

- if < 7 years old, give DTap
- if > 7 years old with no prior Tdap, give Tdap
- if > 7 years old with prior Tdap, give Td

^Tet Ig

- give 250 Units IM at site away from Tet Vac site
- if no Tet Ig available, give Tet IVIg

Table adapted from CDC, 2011 [4]

References

1. Stevens DL, Bisno AL, Chamber HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Disease Society of America. *Clin Infect Dis.* 2014;59:e10-52.
2. Nerad JA. Chapter 13. Eyelid and Orbital Trauma. IN: *Techniques in Ophthalmic Plastic Surgery—A Personal Tutorial*. Elsevier , 2010; pp 355-369.
3. Lee J, Carter KD. Chapter 6. Suture Materials and Needle. IN: *Basic Principles of Ophthalmic Surgery*, TA Oetting (Second Ed.) American Academy of Ophthalmology, 2006, 2011; pp 83-89.
4. Centers for Disease Control and Prevention (CDC). Updated recommendations for use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine from the Advisory Committee on Immunization Practices 2010. *MMWR Morb Mortal Wkly Rep.* 2011;60:13.

This tutorial:
Clark TJE, Shriver EM. Emergent Evaluation of Eyelid Lacerations: A guide for ophthalmology residents. EyeRounds.org. December 17, 2015; Available from: http://www.EyeRounds.org/tutorials/eyelid-lacerations