

INITIAL CARE OF OCULAR AND ADNEXAL INJURIES BY NON-OPHTHALMOLOGISTS AT ROLE 1, ROLE 2, and NON-OPHTHALMIC ROLE 3 FACILITIES

Original Release/Approval	1 Aug 2007	Note: This CPG requires an annual review.	
Reviewed:	13Aug 2014	Approved:	24 Nov 2014
Supersedes:	Initial Care of Ocular and Adnexal Injuries at Level I and Level II Facilities, 6 Mar 2012		
<input type="checkbox"/> Minor Changes (or)	<input checked="" type="checkbox"/> Changes are substantial and require a thorough reading of this CPG (or)		
<input type="checkbox"/> Significant Changes:			

1. **Goal.** To provide a step-by-step approach for the non-ophthalmologist in the care and treatment of ocular and adnexal injuries sustained in the combat theater.
2. **Background.** Despite comprising only 0.1% of the total body surface area, ocular and adnexal injuries account for 8.5% of all U.S. combat casualties. Advances in both ballistic eyewear and acute ophthalmic surgical care have dramatically reduced the incidence of severe vision loss or loss of the eye associated with these injuries. In that regard, prevention is better than treatment; be a zealous advocate for wearing approved eye protection from the Authorized Protective Eyewear List (APEL, available at <http://www.peosoldier.army.mil/equipment/eyewear/>) during any training activity, whether in a combat zone or peacetime garrison.
3. **Evaluation and Treatment: SHIELD AND SHIP at each echelon of care.**
 - a. IF DEALING WITH A CHEMICAL INJURY, IMMEDIATELY BEGIN COPIOUS IRRIGATION.
 - b. Obtain a detailed history, specifically address whether ballistic eyewear was worn correctly at the time of injury, and if possible, check visual acuity in each eye separately.
 - c. **Avoid any maneuver that places pressure on the globe. Do not place any dressings under the shield, or place any dressings that could touch the injured eye or place a ‘head wrap’ over an unshielded eye. Do not ultrasound the globe. Patients suspected of having an open globe injury (e.g. facial fragmentation, lid laceration) should be treated as such, shielded, and transferred to an ophthalmologist. SHIELD AND SHIP.**

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SHIELD AND SHIP

Use either a rigid eye shield (Figure 1A) or an alternative, such as a cup (Figure 1A), the casualty's own ballistic eye armor (Figure 1B and D) even if slightly damaged, or other expedient device that does not place pressure on the globe (Figure 1C).

A rigid eye shield, BY DEFINITION, does not contact the eye and has no dressing underneath it.

Figure 1



Figure 1A



Figure 1B

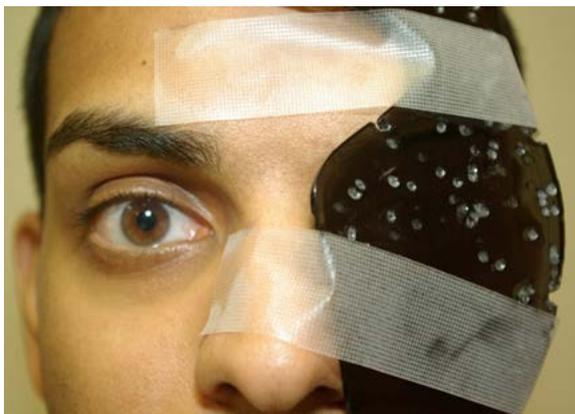


Figure 1C



Figure 1D

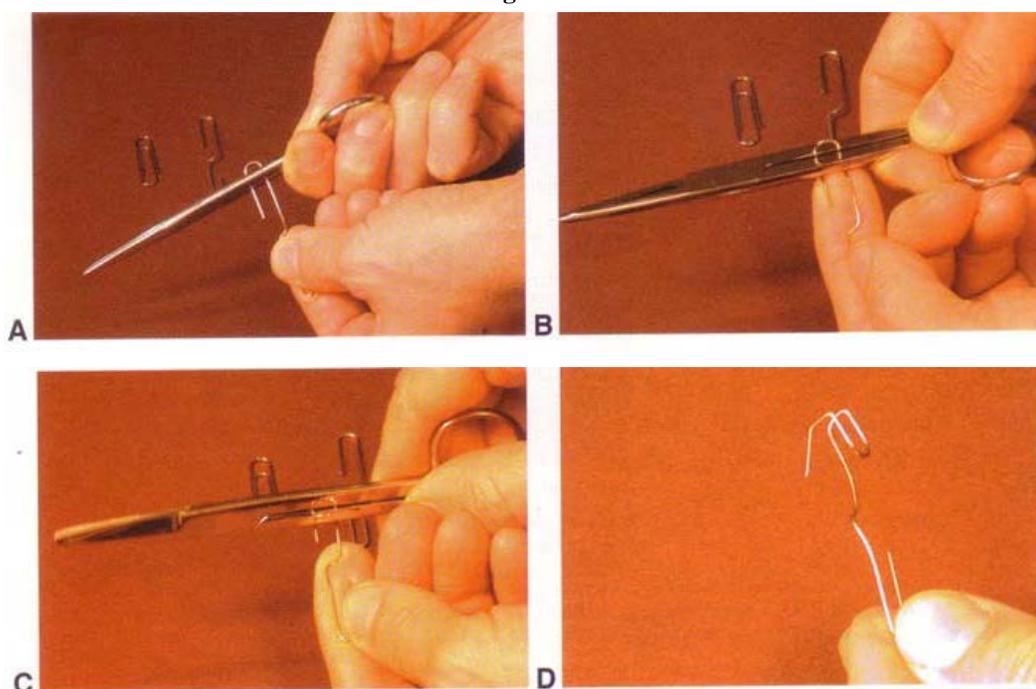
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- d. Ensure a rigid eye shield is present at every echelon of non-ophthalmic care. If the eyelids cannot be opened because of swelling or bruising, suspect an open globe and transfer to an ophthalmologist. **DO NOT** attempt to forcibly open the lids. **SHIELD AND SHIP.**
- e. If undergoing trauma PANSCAN CT and an eye injury is suspected, include thin-cut (1.5-2mm or spiral) axial views of the ORBIT, which will allow adequate reformatting. Do not perform MRI until metal foreign bodies are conclusively ruled out.
- f. If under general anesthesia for other injuries, gently inspect eyes and adnexal structures directly, using bent paper clips to elevate the upper eyelid if necessary, **without placing pressure either directly or indirectly on the globe to assess for a ruptured globe.** (See Figure 2 below on how to make an eyelid retractor from a paperclip.)

Figure 2



- g. Although contact lenses are not routinely authorized in the combat zone or field training, experience shows that troops nevertheless continue to wear them. Examine all serious casualties for retained contact lenses (even non-ocular casualties), but do not attempt to remove them if a globe injury is suspected or if transfer is planned. Make a note for the ophthalmologist.
- h. In an awake patient, superficial conjunctival or corneal foreign bodies may be irrigated away or removed with a moistened sterile swab under topical anesthesia, but use extreme caution, as intraocular tissues can look very much like 'mud' or 'dirt'. Topical anesthesia for an awake patient will make both the examination and irrigation more comfortable. Apply ophthalmic antibiotic ointment if there is no penetrating injury. **NEVER** use topical anesthetics on known or suspected open globes as this can cause further injury. Do not patch the eye.

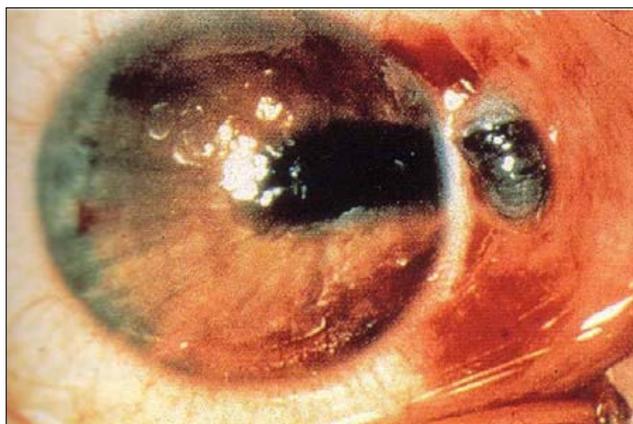
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- i. If there is a possibility of a penetrating eye injury, use ocular Balanced Salt Solution (BSS) for irrigation if available; otherwise, use only normal saline. DO NOT use water.
- j. **DO NOT remove impaled or stubborn foreign bodies from the lids, the orbits, or the eyes. SHIELD AND SHIP.**
- k. Treat corneal abrasions with ophthalmic antibiotic ointment. Do not patch.
- l. Identify ruptured or lacerated eyeball by prolapse of intraocular tissues (such as iris or lens) through a wound ([Figure 3](#)), hemorrhagic swelling of conjunctiva ([Figure 4](#)), positive Seidel sign ([Figure 5](#)) on the cornea, hyphema (blood in the anterior chamber), a very shallow or abnormally deep anterior chamber (compared to uninjured eye), a peaked pupil ([Figure 3](#)), decreased extraocular motility, or severe vision loss. **Do not apply pressure to the eye. Ask the patient not to strain or squeeze their eyelids. Tape a rigid eye shield over the eye or use the casualty's own ballistic eye protection (even if slightly damaged). If a rigid eye shield is not available, other alternatives include the cut out bottom of a paper cup, SAM splints, and anything rigid that can vault over the eye and orbit ([Figure 1](#)). Do not apply a dressing or gauze patch to an open globe. Do not use ointment on an open globe. Avoid interventions that induce nausea/vomiting.** Start Fluroquinolone antibiotic PO or IV (e.g. Ciprofloxacin 500 mg BID, Moxifloxacin 400mg PO, or Levofloxacin 500 mg IV QD), and begin an anti-emetic (Zofran 4 mg IV). Give tetanus prophylaxis. **SHIELD AND SHIP.** Evacuate to ensure Ophthalmologist evaluation and globe surgery can be accomplished within 24 hours of injury.
- m. Uveal prolapse out a scleral wound. **The pupil is peaked toward the site of the rupture with some hemorrhagic chemosis ([Figure 3](#)).**

Figure 3



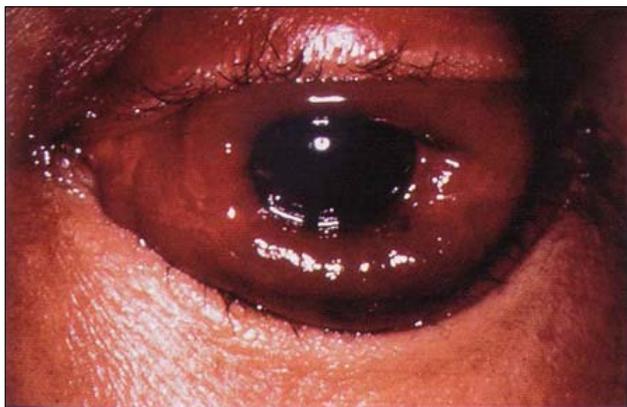
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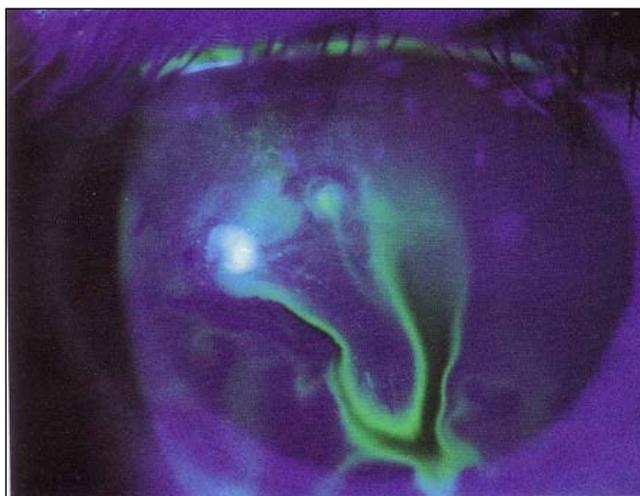
- n. Hemorrhagic swelling of the conjunctiva or hemorrhagic chemosis is an ominous sign of a possible open globe (Figure 4).

Figure 4



- o. A moistened fluorescein strip applied to the cornea can reveal aqueous flowing from a corneal wound by allowing one to visualize the flow of **aqueous fluid out of the eye (Seidel sign)** (Figure 5).

Figure 5



- p. In prepping patients for other head/neck surgery, do not use povidone-iodine scrub or soap (Betadine® scrub or soap) or chlorhexidine (Hibiclens®) in the vicinity of the eye, as they are toxic to the eye and can cause serious damage. Use only diluted Betadine SOLUTION (10% Betadine stock 'paint diluted at least 50:50 with normal saline (NS), then flush with NS.
- q. DO NOT attempt to repair an open globe or penetrating eye injury; SHIELD AND SHIP.

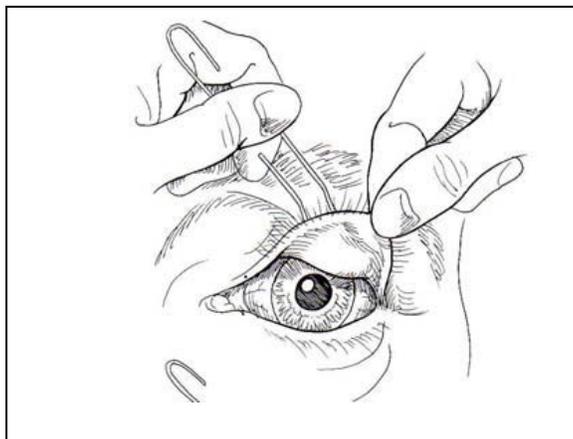
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- r. DO NOT perform primary enucleation, regardless of the apparent severity of the injury; simply **SHIELD AND SHIP** to the ophthalmologist. Enucleation can be delayed in most circumstances to 24 hours or more. Additionally, a far superior cosmetic outcome can be achieved if the enucleation and socket reconstruction are performed by the ophthalmologist.
- s. NEVER provide topical anesthetics such as tetracaine or proparacaine for self-medication. Avoid prescribing topical corticosteroids. NEVER use topical anesthetics on known or suspected open globes as this can cause further injury.
- t. For chemical burns, irrigate for 60 minutes while removing any particles from the eye. You must flip the upper eyelid (**Figure 6**) and inspect the upper and inferior fornices to evaluate for hidden **alkaline or acidic debris**. Topical anesthesia (tetracaine or proparacaine) will make the patient more comfortable during examination and ocular irrigation as long as there is no known or suspected open globe injury.
- u. For superficial foreign bodies, flip the upper eyelid by firmly holding the eyelashes and lifting up while pressing down on the middle of the eyelid at the border of the tarsus with a paperclip or the shaft of cotton tipped applicator (**Figure 6**). DO NOT ATTEMPT if there is a possibility of penetrating eye injury.

Figure 6



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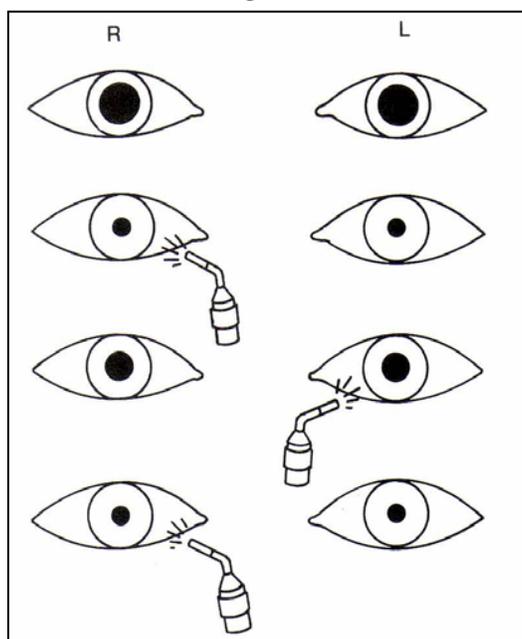
- v. If you suspect orbital compartment syndrome from intraorbital bleeding—gross proptosis ([Figure 7](#)), rock-hard, tense tissues that are resistant to retropulsion (direct pressure), decreased vision, intense pain, color vision loss, or afferent pupillary defect (APD, or Marcus-Gunn pupil)—perform lateral canthotomy and cantholysis. (See the [Emergency War Surgery Handbook](#) for specific details).

Figure 7



- w. A Marcus-Gunn pupil, or afferent pupillary defect (APD), is a sign of severe optic nerve dysfunction. An example of this is demonstrated in [Figure 8](#). The pupils are dilated in the dark. A bright light shone in an eye with a normal optic nerve will cause pupillary constriction of BOTH eyes. If one then swings the light quickly to the eye with optic nerve dysfunction both pupils will then dilate. Swinging the light back to the good eye causes constriction of both pupils again. This indicates that there is a left afferent pupillary defect ([Figure 8](#)).

Figure 8



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- x. Patients with orbital fractures (blunt periorbital trauma with decreased extraocular motility, especially in vertical gaze and numbness on cheek) should be told not to hold in sneezes and not to blow their nose, which may cause orbital emphysema and optic nerve compression. May give systemic antibiotics and send for evaluation by Ophthalmology, ENT, or OMFS. Be aware of cabin altitude effects on potential intraorbital air from sino-orbital communication. Monitor vision and ocular pain status during transport for the possibility of vision loss from compressive optic neuropathy from expanding orbital emphysema. If either occurs, aircraft should reduce cabin altitude if feasible.
- y. Lacerations involving the margin of eyelid should be repaired by an Ophthalmologist ([Figure 9](#)).

Figure 9



- z. Deep eyelid laceration that should be explored by an Ophthalmologist ([Figure 10](#)). If there is eyelid tissue that is amputated or partially amputated, DO NOT discard. Wrap in moist gauze and send with patient.

Figure 10



- aa. If the cornea is exposed because of eyelid tissue avulsion or retraction of eyelids due to burns, apply ophthalmic lubricating ointment (re-apply frequently), protect the cornea and eye by applying a rigid eye shield and evacuate the patient to a Role 3 Ophthalmologist. DO NOT USE nonophthalmic ointments or solutions on the eye.
- bb. In case of laser exposure/ injury, gather specific details about the incident (date/ time of injury, activity at the time, type of laser, duration of exposure, proximity to laser, etc). Check visual acuity in each eye separately. Contact ophthalmology to coordinate evacuation and evaluation.
- cc. Familiarization with ocular issues related to medically evacuated individuals via air transport can be found in [Reference 7 \(AFI 41-307, Ch 11.1\)](#).

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4. Performance Improvement (PI) Monitoring.

- a. Intent (Expected Outcomes).
 - 1) All patients will have a basic eye and vision exam on admission which will be documented on the Tactical Combat Casualty Care (TCCC) Card (DD Form 1380), or the Resuscitation Record or elsewhere in the medical record.
 - 2) Rigid eye shields are utilized and applied correctly at all echelons of non-ophthalmic care so there is no pressure on the globe and no dressings between the shield and the globe, in all cases of suspected or know globe injury. Also documented from point of injury through all echelons of care.
 - 3) Systemic fluoroquinolone antibiotics are given: Moxifloxacin 400mg PO from the Combat Pill Pack, Ciprofloxacin 500mg PO BID, or Levofloxacin IV QD.
 - 4) All patients are referred to an Ophthalmologist in theater for known or suspected globe injuries.
- b. Performance/Adherence Measures.
 - 1) All patients received basic eye and vision exams during initial evaluation and results were documented on the TCC Card, Resuscitation Record or elsewhere in the medical record.
 - 2) Rigid eye shields without underlying gauze was placed correctly at all non-ophthalmic echelons of care, over the eye and against the bony prominences around the eye when known or suspected globe trauma and/or injury existed. Documentation at all echelons of care.
 - 3) Appropriate systemic antibiotics were administered.
 - 4) All patients with known or suspected globe injuries were referred to an Ophthalmologist in theater.
- c. Data Source.
 - 1) Patient Record
 - 2) DoD Trauma Registry (DoDTR)
 - 3) Resuscitation Record
- d. System Reporting & Frequency. The above constitutes the minimum criteria for PI monitoring of this CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the Joint Theater Trauma System (JTTS) Director, JTTS Program Manager, and the Joint Trauma System (JTS) Performance Improvement Branch.

5. **Responsibilities.** It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance and PI monitoring at the local level with this CPG.

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6. References.

- ¹ Tactical Combat Casualty Care Guidelines 2014. Available at http://www.usaisr.amedd.army.mil/assets/pdfs/TCCC_Guidelines_140602.pdf
- ² BSCS series published by the American Academy of Ophthalmology
- ³ Ophthalmic Care of the Combat Casualty
- ⁴ Neuro-Ophthalmology by Frank J. Bajandas
- ⁵ <http://www.kellogg.umich.edu/theeyeshaveit/trauma/images/laceration-lid.jpg>
- ⁶ [Emergency War Surgery Handbook](#)
- ⁷ [Air Force Instruction 41-307, Aeromedical Evacuation Standards of Care, July 2011](#)

Approved by CENTCOM JTTS Director, JTS Director and
CENTCOM SG

Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the Services or DoD.

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APPENDIX A

ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGs

1. Purpose.

The purpose of this Appendix is to ensure an understanding of DoD policy and practice regarding inclusion in CPGs of “off-label” uses of U.S. Food and Drug Administration (FDA)–approved products. This applies to off-label uses with patients who are armed forces members.

2. Background.

Unapproved (i.e., “off-label”) uses of FDA-approved products are extremely common in American medicine and are usually not subject to any special regulations. However, under Federal law, in some circumstances, unapproved uses of approved drugs are subject to FDA regulations governing “investigational new drugs.” These circumstances include such uses as part of clinical trials, and in the military context, command required, unapproved uses. Some command requested unapproved uses may also be subject to special regulations.

3. Additional Information Regarding Off-Label Uses in CPGs.

The inclusion in CPGs of off-label uses is not a clinical trial, nor is it a command request or requirement. Further, it does not imply that the Military Health System requires that use by DoD health care practitioners or considers it to be the ‘standard of care.’ Rather, the inclusion in CPGs of off-label uses is to inform the clinical judgment of the responsible health care practitioner by providing information regarding potential risks and benefits of treatment alternatives. The decision is for the clinical judgment of the responsible health care practitioner within the practitioner-patient relationship.

4. Additional Procedures.

- a. **Balanced Discussion.** Consistent with this purpose, CPG discussions of off-label uses specifically state that they are uses not approved by the FDA. Further, such discussions are balanced in the presentation of appropriate clinical study data, including any such data that suggest caution in the use of the product and specifically including any FDA-issued warnings.
- b. **Quality Assurance Monitoring.** With respect to such off-label uses, DoD procedure is to maintain a regular system of quality assurance monitoring of outcomes and known potential adverse events. For this reason, the importance of accurate clinical records is underscored.
- c. **Information to Patients.** Good clinical practice includes the provision of appropriate information to patients. Each CPG discussing an unusual off-label use will address the issue of information to patients. When practicable, consideration will be given to including in an appendix an appropriate information sheet for distribution to patients, whether before or after use of the product. Information to patients should address in plain language: a) that the use is not approved by the FDA; b) the reasons why a DoD health care practitioner would decide to use the product for this purpose; and c) the potential risks associated with such use.

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