

EYE TRAUMA

To a clinician without experience, a person with an eye injury presents a dilemma. This article should reassure you that methodical assessment and treatment of most injuries is simple and within the ambit of every doctor.

JONATHAN PONS, MB ChB, Dip Ophthalmol, Dip Anaesth

Project director: Good Shepherd Hospital Eye Clinic, Swaziland

Jonathan has devoted his medical career to serving in the remote and rural areas of southern Africa. He has been the only ophthalmic surgeon for the Kingdom of Swaziland the last 10 years. He is actively involved in research into community blindness and has an active training programme.

Correspondence to: Jonathan Pons (jono@mabuda.com)

When assessing your patient, critical questions are: Mode of injury? Was there chemical splash? Is there any possibility of a foreign body?

Examination

- E-chart to test visual acuity.
- Position patient for examination, seated on same side as the eye under scrutiny.
- Check the red reflex by looking through the ophthalmoscope at 40 cm distance.
- Note your findings in an orderly fashion: orbit, lids, conjunctiva, cornea, anterior chamber, iris, pupil reaction, lens, fundus.
- Stain cornea with fluorescein.

It is advisable to examine the eye as soon as possible since a delay will invariably lead to lid swelling, making the examination far more difficult. This can be overcome using cotton tips to retract the eyelids, or lid retractors can be made from bent paper clips (Illustration 1). Clinical photographs and accurate documentation are advised for medico-legal cases.

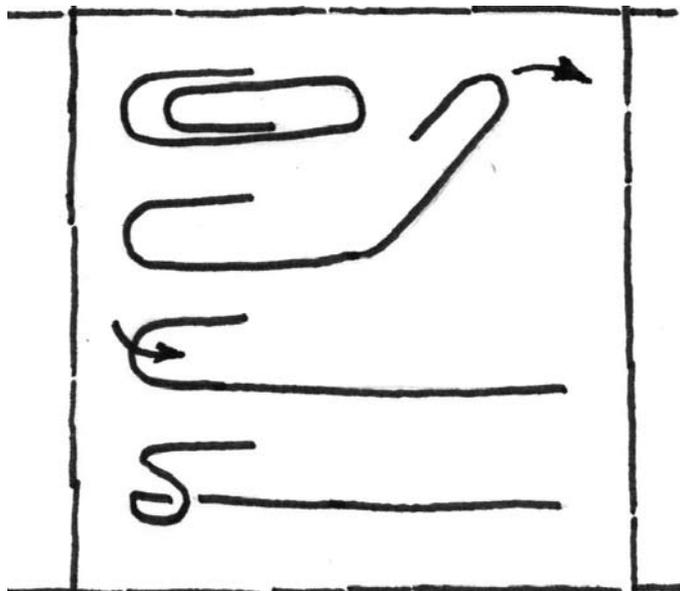


Illustration 1. Lid retractor made from bent paper clip.

Chemical splash

This is arguably one of the most urgent of all interventions. Acids remove the epithelial layer but cause relatively little damage to the eye compared with alkaline agents (Fig.1). Immediate, copious irrigation of the eye for as long as the patient can tolerate, cannot be overemphasised. Use at least one litre of normal saline with an administration set,

forcing the lids apart if necessary. Anaesthetic eye drops are needed. Particulate matter, e.g. cement, should be removed with cotton tips; it may deposit in folds in the inferior conjunctiva. Treat chemical splash with atropine and antibiotic eye drops, and refer the patient if there is any vision loss.



Fig. 1. Severe alkali burn. Note the corneal oedema.

Lid lacerations

A full-thickness laceration requires suturing in 3 layers: approximation of the eyelid margin at 'grey line' (mattress suture, buried in the wound). Tarsal plate repair (interrupted), muscle and then skin. All sutures should be 6/0 vicryl. Poor technique may cause notching of the eyelid or eyelash malposition. For a full description, see the *SA Family Practice Handbook*.¹

With lower eyelid injury, exclude any cannalicular damage. If present, referral is needed since 80% of tears drain via the inferior cannaliculus (Fig. 2). Remember tetanus prophylaxis in all cases.



Fig. 2. Lid laceration.

Subconjunctival haemorrhage

Alarming as it looks, subconjunctival haemorrhage, on its own, is harmless but will take 6 weeks to resolve. If the vision and examination are normal, this may be treated conservatively (Fig. 3).

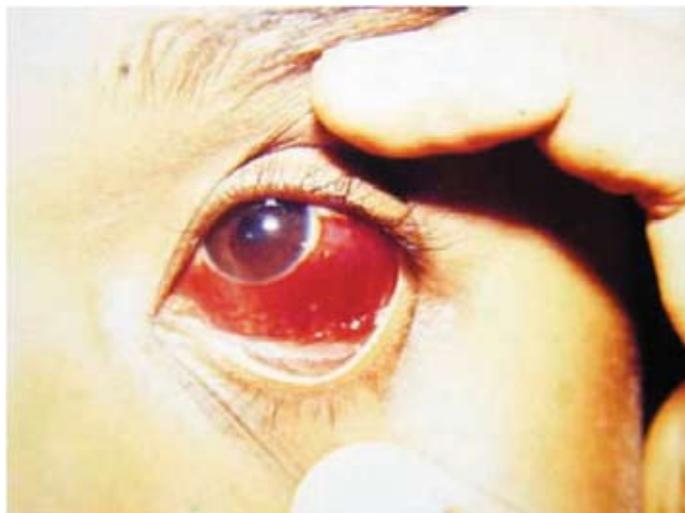


Fig. 3. Conjunctival haemorrhage.



Fig. 4. Intraorbital foreign body.

Penetrating intraorbital foreign body (IOFB)

You should suspect IOFB if there is a history of hammering metal, a projectile injury or explosion. Decreased visual acuity or poor red reflex should alert you and an X-ray examination of the orbit should locate ferrous IOFBs (Fig. 4). An MRI is needed to exclude non-ferrous IOFBs. Do not request MRI if the IOFB is ferrous! The magnetism in the MRI can cause movement of the ferrous material and further damage to the eye.

Corneal foreign bodies (FB) and abrasions

Grinding, hammering and leaning out a car window are common causes of corneal foreign bodies and abrasions. Examine while sitting at the head of a couch, with the patient lying supine and fixing his gaze vertically above. After using anaesthetic drops, use a 21G needle to remove the FB. If deeply embedded or it has entered the eye, refer.

Angle grinders are the biggest offenders and the ferrous FBs will cause a 'rust ring' which is easier to remove after a few days. If the patient can feel a FB, yet none is seen on the cornea, it may be embedded on the upper tarsus. Evert the eyelid where the FB may be wiped off with a

moist cotton tip (Fig. 5). Corneal abrasions are very painful but usually heal well unless they become infected and create an ulcer. Treat with topical antibiotics.



Fig. 5. Foreign body on tarsal plate.

Corneal or scleral laceration

A corneal laceration is usually indicated by prolapsed dark-coloured iris, or by a collapsed anterior chamber. Use an antibiotic eye ointment, protect the eye with a pad or shield, give tetanus prophylaxis and refer. Dark choroidal tissue may be seen on or under the conjunctiva with a scleral laceration. Refer.

Hyphaema

Blunt injury by a fist, tennis ball or smaller object that breaches the protection afforded by the orbital bones, commonly causes haemorrhage in the anterior chamber. This blood settles into a level easily visible in the anterior chamber. If the anterior chamber completely fills with blood this is called a 'black ball' and requires admission, diamox 250 mg qid, timolol and referral for drainage. If the hyphaema is less than 75%: timolol bd, atropine drops, dexamethasone eye drops 6 hourly. There is a danger of a re-bleed, so strict bed rest for 7 days is needed. If less than 15%: bed rest. In all cases, check visual acuity and the retina or refer (Fig. 6).



Fig. 6. Child with hyphaema.

Prognosis after eye injury

This is determined by the presenting visual acuity and the complexity of the injury. It can be estimated using the ocular trauma score (<http://www.asotonline.org/ots>).²

Eye trauma

What you don't want to miss!

- Intraocular foreign body (FB)
- FB on the cornea or tarsal plate
- Confusing an ulcer with an abrasion
- A cranial injury (Fig. 7)
- Injury to the fellow eye, e.g. in an unconscious patient (Fig. 8)

Eye examination kit

- E-chart at 6 metres
- Ophthalmoscope or concentrated light source (penlight)
- Magnifier such as loupe
- Benoxinate 0.4% or Amethocaine 0.5%
- Fluorescein stain: paper strips or drops
- Antibiotic drops
- Dilating drops tropicamide 1%
- Cotton wool buds
- Wire speculum

Children

For examination, children's confidence can be won but it may be necessary to resort to wrapping the child in a blanket with arms separated in the layers, and head on your knees, (Illustration 2). Use of sedation (e.g. Vallergran Forte 3 mg/kg orally) or even a general anaesthetic is sometimes needed.



Illustration 2. Examination of a child.

Terms

- Abrasion = defect of corneal epithelium
- Contusion = blunt injury
- Closed injury = wall of globe intact, but inside damage
- Rupture = due to blunt injury, often away from site of injury, at weakest point of globe at equator
- Open injury = full-thickness break in the wall
- Lamellar laceration = partial thickness corneal wound
- Penetration = entry wound only
- Perforation = through and through

A study on penetrating eye injuries in South African children found that most were injured in play, 55% at home, and 85% in the absence of a caregiver. Sticks, wire and glass caused half of all injuries. Most



Fig. 7. Eye injury may mask a serious head injury.



Fig. 8. Do not neglect the fellow eye!

children regained vision >6/60 and half of injured children regained vision >6/12. A consistent finding of most studies shows that delay to presentation does not worsen prognosis.³

Big offenders

Industrial workers should be protected by safety glasses but injuries occur nonetheless. Eye trauma is frequent in homes, farms and backyards where safety glasses are not available. Angle-grinders, metal beating, hammering, fence mending, herding animals, forestry, fire fighting and cutting sugar cane are big offenders. In holiday time, new children's toys take their toll.

References available at www.cmej.org.za

IN A NUTSHELL

- Trauma near the eye warrants a thorough eye examination.
- Chemical splash into the eye requires immediate irrigation.
- Lid lacerations should be correctly sutured, or referred.
- Foreign bodies may lodge on cornea, tarsal plate or penetrate the globe.
- Corneal laceration presents with iris on the cornea or a shallow anterior chamber.
- Hyphaema requires bed rest.
- Prognosis for vision after an injury is determined by visual acuity and complexity of injury.
- An eye examination kit should be available in every emergency room.