PAEDIATRIC ACUTE CARE GUIDELINE	
Eye Trauma	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

This document should be read in conjunction with this DISCLAIMER
http://kidshealthwa.com/about/disclaimer/

Eye Trauma

Background

Eye injuries may be difficult to assess in the distressed child. Provide analgesia and/or topical anaesthetic early to aid assessment.

Mechanism of injury will provide clues for specific injuries to exclude

- Blunt trauma with large objects (sporting equipment, fists):
  - Globe rupture, retrobulbar haemorrhage, orbital rim/blowout fracture, retinal tear, vitrous/retinal haemorrhage, hyphema, corneal abrasion
- Sharp objects (wire, sticks, glass) and reasonable force (thrown, fallen onto, flicked):
  - High risk of ocular penetration
- Small high velocity objects (hammering metal or ceramic):
  - Risk of ocular penetration, retained intraocular foreign body, corneal foreign body

- **In obvious penetrating ocular trauma**, defer detailed examination until theatre. If in doubt, refer to ophthalmology.
- **In significant trauma**, exclude retrobulbar haematoma and optic nerve dysfunction urgently (tense proptosis, visual acuity, pupils, eye movements)

Assessment

Assessment and management of eye trauma should occur after resuscitation in major trauma, and with consideration of head and C-spine injuries.

History

- Possible exposure to foreign body, chemicals or high velocity projectiles (eg lawn mowers, power tools, MVA)
- Contact lens use
- Pain, foreign body sensation
- Blurred vision, flashing lights/floaters/field defect (retinal detachment)
- Tearing, discharge, photophobia
- Diplopia
- First aid provided
- Immunisation status

Examination

- Provide analgesia and/or topical anaesthetic (amethocaine 1%)
- Warm compresses / saline gauze will help loosen eyes glued shut by dried blood
- Dry gauze and gentle traction to upper and lower lids will help open eyes swollen shut
- **Avoid eyeball pressure**
- If adequate assessment is not possible due to lack of co-operation, seek senior or specialist help

1. General Observation
• **Red Flags** – seek urgent senior/ophthalmology review
  ◦ Proptosis, limited eye movements – retrobulbar haematoma
  ◦ Enopthalmia, distorted globe, chemosis, limited movements – globe rupture
• If suspected penetrating injury/globe rupture **do not force the eyelid open**

2. Visual Acuity
• **Must document** – prioritise (except in major trauma or chemical burn)
  ◦ Age appropriate chart
    ▪ Snellen – from school age
    ▪ Picture or E charts – pre-school age
      • > 2 lines difference between eyes is likely to to be significant
  ◦ Fingers or toys, fix and follow < 2-3 years
  ◦ Light perception
  ◦ Pin-hole testing (if glasses not with child) will correct up to 6/9

3. Pupils
• Shape, light reflex, distortion, size, asymmetry
• Swinging light test for relative afferent papillary defect (RAPD)
  ◦ Swing light from eye to eye – if affected pupil dilates RAPD is present
  ◦ May be present in retrobulbar haematoma with optic nerve compression, ruptured globe, large retinal detachment, vitreous haemorrhage

4. Eye Movement
• Limited with:
  ◦ Retrobulbar haematoma
  ◦ Ruptured globe
  ◦ Orbital rim fractures with extraocular muscle entrapment

5. Visual Fields
• Deficit with: R
  ◦ Retinal detachment
  ◦ Intraocular foreign body

6. Periorbital Region
• Palpate orbital rim for bony tenderness or step
  ◦ Orbital rim fracture, check eye movements and infraorbital nerve entrapment (sensation over central upper lip/gum)
• Bilateral peri-orbital bruising
  ◦ Consider base of skull fracture

7. Lids, Conjunctiva, Sclera
• Foreign body: include eyelid eversion and fluoroscein exam
  ◦ Vertical corneal abrasions = foreign body under eyelid
• Eye lid lacerations
  ◦ Full thickness laceration = suspect globe penetration
  ◦ Medial third involvement = possible lacrimal duct injury
  ◦ Involvement of eyelid margin
• Subconjunctival haemorrhage
  ◦
If posterior extent not visualised suspect orbital/base of skull fracture

8. Cornea, Anterior Chamber, Iris
• Look for obvious foreign body, epithelial defect
• Perilimbal/ciliary injection (red around iris) = anterior chamber injury
• Hyphema (blood will layer in anterior chamber, dusty/stars on slit lamp)
• Fluoroscein
  ◦ Use blue light (on Slit lamp, most fundoscopes, Wood's lamp in treatment room + consultant office)
  ◦ Highlights corneal abrasions, foreign bodies, chemical burns
  ◦ **Seidel sign** for full thickness laceration
    ■ Fluoroscein will appear to 'waterfall' with blinking as aqueous humour leaks out
• Best assessed with the slit lamp if > 3 year old and co-operative

9. Fundoscopy
• Vitreous haemorrhage – diminished red reflex, difficulty visualising fundus, red splotches
• Retinal detachment – grey flap at periphery
• PanOptic fundoscope in consultant office refer to PanOptic Ophthalmoscope Quick Reference Guide

Management

Approach to Specific Injuries

Penetrating Eye Injury / Suspected Globe Rupture
• Penetrating or blunt trauma with distorted globe, hyphema, chemosis, loss of vision/red reflex/eye movements, asymmetric pupil, RAPD
• **Emergent ophthalmology referral**
• Analgesia
• Anti-emetics to prevent vomiting /raised intraocular pressure
• Protective hard shield over eye if tolerated
• Do not apply pressure to globe
• Do not attempt foreign body removal
• Keep fasted
• IV Antibiotics, tetanus
• Consider imaging (X-Ray or orbital CT) if intraocular foreign body suspected

Retrobulbar Haematoma with Optic Nerve Compression
• Blunt or major trauma causing compartment syndrome of eye
• Tense proptosis, limited eye movements, decreased visual acuity, RAPD
• **Emergent ophthalmology referral**
• Analgesia
• CT may assist in diagnosis if unclear
• Requires **urgent surgical decompression**; do not delay opthalmological referral for CT

Corneal Burns (Strong Acid/Alkali)
• Copious irrigation (≥ 2 litres of 0.9% saline over 20 minutes) **ASAP**
• Topical local anaesthetic +/- analgesia will facilitate irrigation
• Evert eyelid to remove excess chemical/debris
• Check pH with pH sticks/ litmus paper: pH 6.5-8.8 acceptable
• **Urgent ophthalmology referral**
• Contact Poisons Information Centre 131126 for other chemicals

Orbital Wall / Blow Out Fracture
• Blunt trauma to orbit – look for entrapment (inferior rectus muscle: can't look up /infraorbital nerve: sensation upper lip/gum)
• Analgesia, no nose blowing
• CT face (less radiation than plain X-Ray facial views) – discuss with senior
• **Urgent ophthalmology referral**
• +/- plastics/maxillofacial surgical involvement

Eyelid Laceration
• Analgesia, tetanus
• **Exclude penetrating eye injury**
• **Urgent ophthalmology referral for exploration/repair**
  ◦ If involving medial third of eyelid – possible nasolacrimal duct injury
  ◦ If involving eyelid margin, tarsal plate, canthi
  ◦ If significant tissue loss/distortion
• Minor lacerations superficial to tarsal plate – consider repair in ED or semi-urgent ophthalmology referral

Full Thickness Corneal/Sclera Lacerations
• Analgesia, tetanus
• Keep fasted
• Semi-urgent ophthalmology referral

Hyphema
• Blunt trauma with blood in anterior chamber
• Gross layering of blood or 'dust/stars' on slit lamp exam
• **Urgent ophthalmology referral** if suspected acute glaucoma
• Analgesia, bed rest, head elevated 45 degrees
• **Do not apply dilating drops** (may precipitate acute glaucoma)

Retinal Detachment
• Blunt trauma with loss of vision, shadow/curtain on fundoscopy
• **Urgent ophthalmology referral**

Vitreous or Retinal Haemorrhage
• Blurring or loss of vision, haemorrhage visible on fundoscopy
• **Urgent ophthalmology referral**

Post Traumatic Iritis
• Blunt trauma, pain on accommodation
• Local anaesthetics do NOT improve pain
• Semi-urgent ophthalmology referral

Corneal Foreign Body
• Local anaesthetic for assessment/removal
• Use fluorescein to exclude full thickness penetration (Seidel sign) and embedded eyelid FB (multiple vertical abrasions)
• Evert eyelid to ensure no foreign body embedded in eyelid
• Small foreign bodies may be removed by flushing with normal saline, cotton bud or needle in ED if co-operative
  ◦ Use slit lamp for older children
• Metal foreign bodies (grinders) may leave a residual rust ring:
  ◦ Discharge with chloramphenicol ointment qid to soften rust ring
  ◦ Follow up in eye clinic for completion of removal in 1-3 days
• **Refer large, deep or central corneal foreign bodies for removal**

Corneal Abrasions
- Local anaesthetic (not for discharge for ongoing use)
- Simple analgesia
- Evert eyelid to exclude foreign body
- If large or involving visual axis refer follow up with ophthalmology within 24 hours

This document can be made available in alternative formats on request for a person with a disability.

File Path:			
Document Owner:	Dr Meredith Borland HoD, PMH Emergency Department		
Reviewer / Team:	Kids Health WA Guidelines Team		
Date First Issued:	28 May, 2015	Version:	
Last Reviewed:	28 May, 2015	Review Date:	28 May, 2017
Approved by:	Dr Meredith Borland	Date:	28 May, 2015
Endorsed by:	Medical Advisory Committee	Date:	28 May, 2015
Standards Applicable:	NSQHS Standards: 		

Printed or personally saved electronic copies of this document are considered uncontrolled