Sports–Related Ocular Trauma: Prevention, Identification and Treatment

Fred Edmunds, OD, FAAO
XTREMESIGHT Performance
Victor, NY
Seattle, WA 2015

About ‘Dr. Fred’ Edmunds
› Est. XTREMESIGHT’06, a sports vision only clinic
› Formerly 17 yrs. @ B&L
› Dir. of Olympic Vision Centre @ ’92 Games
› ‘Father’ of MAXSIGHT
› AOA SV OD of yr. – 1993
› AOA SVS Chair–elect
› Action sports athlete
› Vested interest in sports vision

Lecture objectives
› Discuss sport–related eye injury demographics
› Become familiar with the most common types of sports–related eye injuries
› Discuss triage & treatment of injuries
› Learn to recognize when to treat and when to refer for advanced ophthalmologic care
Sports Eye Injury Prevention

Eye Injury Prevalence (all trauma)
- 2.5 million cases per year in U.S.
- 40-45K cases of permanent visual impairment
- Accounts for 20% of unilateral blindness; 7% of bilateral
- 70% male, inc. prevalence—younger athletes
- Sports related ocular trauma = 600,000+ per year

Sports Eye Injury Demographics
- Coalition to Prevent Sports Eye Injuries (www.sportseyeinjuries.com)
  - More than 600,000 eye injuries related to sports and recreation occur each year
  - 42,000 of these injuries are of a severity that requires Emergency Room attention
  - Sports participants using "street wear" are at a far more severe risk of eye injury than participants using no eye protection at all

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3. Tri-Service Vision Conservation and Readiness Program: Eyes (Ears) and Workers Compensation
5. National Eye Institute
Sports Eye Injury Demographics

- Incidence (Prevent Blindness America 1993)
  - #1: Basketball (20.8%)
  - #2: Baseball (14.9%)
  - #3: Swimming & Pool Sports (8.4%)
  - #4: Racquet and Court Sports (7.8%)

Injuries in Sports by Age

<table>
<thead>
<tr>
<th>5-14 year olds</th>
<th>15-24 year olds</th>
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<tbody>
<tr>
<td>Basketball</td>
<td>Basketball</td>
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<tr>
<td></td>
<td>16.5%</td>
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<td></td>
<td>34.0%</td>
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<td>Baseball</td>
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<td>15.5%</td>
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<td>7.2%</td>
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<tr>
<td>Swimming &amp; pool sports</td>
<td>Racquet &amp; Ct. sports</td>
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<tr>
<td></td>
<td>12.5%</td>
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<td>8.1%</td>
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<table>
<thead>
<tr>
<th>25-64 year olds</th>
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<tbody>
<tr>
<td>Basketball</td>
<td>19.6%</td>
</tr>
<tr>
<td>Swimming &amp; pool sports</td>
<td>14.9%</td>
</tr>
<tr>
<td>Racquetball &amp; Ct. sports</td>
<td>6.7%</td>
</tr>
</tbody>
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Total injuries of all ages: 39,297

Eye Injuries Associated w/ Sports

Prevent Blindness America

- The use of protective eyewear could effectively reduce the frequency and severity of sports related eye injuries by 90%.
- Should comply with the appropriate ASTM standard
Medico-Legal Considerations

- Duty to Inform
  - History should determine if "street eyewear" is worn for sports
  - Obligated to warn in U.S.
- Document Recommendations
  - Mandatory protection for "one-eyed" athletes
  - Mandatory protection for post-trauma/surgery
  - Consider for high refractive errors (myopia)
  - Replace protectors when yellowed

Functionally Monocular Athletes

- Criteria: <20/40 (6/12) best corrected
- Risk of blindness increased by >15x
- Risk is averted with protective eyewear use
- Discourage participation in sports with a risk for serious eye injury in which an effective method of eye protection does not exist
  - Examples: boxing, wrestling, martial arts

Protective Eyewear for Sports

  - ASTM F803 standards
    - basketball, baseball fielders, racquet sports, field hockey and women's lacrosse, soccer (pending)
  - ASTM F910: baseball batters and base runners
  - ASTM F513: Ice hockey
  - ASTM F1776: Paintball
  - ASTM F659: Skiing goggles/shields
Identification and Management of Sports-Related Ocular Injury

Injury Identification & Management

- Discussion re: symptoms, signs and management (triage)
- Most injuries should be handled by eye care professional
- Determine the context of the injury from the player or eye-witness, if possible

Eyelid/brow laceration

- Laceration of the area surrounding the eye
- Superficial
  - Apply pressure to stop bleeding
  - Cleanse wound
  - Apply sterile dressing
- Deeper lacerations
  - May notice:
    - Fat herniation
    - Muscles
Eyelid / brow laceration

- Deeper lacerations
  - Apply pressure
  - See eye care professional
- Depending on depth, you may be able to handle on the field or need a referral

Periorbital Ecchymosis ("Black Eye")

- Blood accumulation – usually greater along lower lid
- Occasionally forms a firm mass – hematoma
- Need to be careful as there may be a lot of damage to eye

Periorbital Ecchymosis ("Black Eye")

- Be sure to rule out:
  - Lid swollen shut
  - Blood inside eye
  - Cornea is white or hazy
  - Irregular, fixed, dilated, or constricted pupil
  - Visual problem (stars, floaters, distortion)
  - Eye pain
Periorbital Ecchymosis ("Black Eye")

- If the athlete has none of the previous findings, you can:
  - Apply cold compress for first 24–48 hrs
  - Hot packs for days 3–5
- If there is no improvement, you should refer as there may be larger issues

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Blow-out Fracture

- Have athlete follow pen/light/finger up and down along midline and along shoulders
  - During this time, make sure the eyes are equal in movement
- Athlete may notice
  - Pain
  - Double vision

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Blow-out Fracture

- A break in the floor of the orbit
  - Can also be in the nasal wall
- Inferior rectus muscle gets trapped in the fracture
  - Limits ability to move eye
- Eye may look sunken
- May have significant muscle entrapment if athlete has:
  - Intense pain
  - Nausea / vomiting
  - Inability to look up at all
- Immediate referral to ophthalmologist is recommended
Blow-out Fracture

- Imaging will be performed to look at the bone structure
- May need surgery

Subconjunctival Hemorrhage

- Blood trapped between the conjunctiva and the sclera
  - Remember a slide cover on a microscope?
  - Isolated, it is not a big issue
  - Best evaluated by
    - Having athlete look in all directions of gaze

Subconjunctival Hemorrhage

- Can be caused by:
  - Rubbing eye, sneeze, lifting heavy objects, vomiting, trauma, etc
  - Recommend cold compress to decrease risk for extra bleeding
  - Comprehensive eye evaluation to assess for other potential side effects
  - If it is ONLY a ‘subconj’
    - It will move down to the lower portion of the eye (gravity)
    - The more blood, the longer it takes to resolve
Corneal Abrasion

- One of the most common sport-related eye injuries
- Normal signs
  - Pain
  - Tearing
  - Redness
  - Vision could be reduced

If a minor abrasion – athlete should probably not play until signs subside
- Consider instilling artificial tears and/or lavage
- If pain subsides, may be okay to play
- May want to refer urgently due to pain, size, concern, etc
- Assess impact on vision
- Assess size & depth of abrasion (poss. scaring)
- Can cause inflammation

Corneal Foreign Body

- A foreign material on the clear part of the eye, on the conjunctiva, or under the lid
- Another very common eye injury
- Normal signs
  - Pain
  - Tearing
  - Redness
  - Vision could be reduced
Corneal Foreign Body

- Assess vision
- Try not to rub
- Locate foreign body
  - Sometimes the particle will get stuck under the upper lid
  - Assess sodium fluorescein and look for foreign body tracking

If the object is visible
- Lift object gently with tissue or cotton moistened with sterile eye solution
- Consider lavaging with eye wash
- If that removes the particle, then instill artificial tears for comfort
- If particle is embedded, may require advanced removal technique (spud, Alger brush, etc.)

If object is not visible
- Grasp upper lashes, pull lid forward and down
- Allows tears to wash out foreign body

Consider referral to ophthalmologist if:
- Object remains after attempted removal
- Object appears to have penetrated the cornea or sclera
- Blood in the anterior/posterior chamber of eye
Trumatic Iritis

- If one is hit in the eye, this may start an inflammatory cascade inside the eye
  - Analogous to swelling of an ankle after twisting
- The problem...
  - Cannot see with naked eye
    - needs to be assessed with microscope

Trumatic Iritis

- Due to the impact on the eye and surrounding tissues, the iris (colored part) is injured
  - It then releases inflammatory bi–products
  - Can become swollen and sticky
  - Leads to a distorted pupil
- Athlete may notice:
  - Pain
  - Sensitivity to light
  - Pressure

Trumatic Iritis

- Anyone who takes a significant hit (blunt trauma), should be assessed for iritis by an eye care provider
- Another reason why it is important to refer someone who you suspect may only have a "black eye"
Hyphema
- Blood in the anterior chamber due to iris bleed
- Caused by sig. trauma
- Graded by amount of blood in anterior chamber
- May have other issues
- Athlete should restrict activity to aid recovery
- May need surgery to remove blood

Dislocated lens
- Lens is dislocated from its supporting fibers
- Due to a significant blow to the eye
- Vision will be significantly affected
- May also notice some flashes of light
- Recommend photos
  - Red reflex has changed
- Refer to ophthalmologist immediately
- Will probably need surgery

Traumatic Retinal Detachment
- Due to significant trauma – the retina separates from the supporting structures
- Athlete will commonly notice:
  - Flashes of light that don’t go away
  - Black spots in vision
  - Distortion or loss of vision
- Refer athlete to ophthalmologist as soon as possible
- May require immediate surgery
Ocular Emergency Kit for the Athletic Trainer

- Bottle sterile eye wash solution
- Bottle contact lens disinfecting solution
- Contact lens cases
- Lubricating/rewetting drops
- Anesthetic
- Sterile cotton swabs
- Fluorescein strips
- Pen light
- Informational sports-related ocular emergency triage card

Sports–Related Ocular Emergencies

Triage Card from AOA SVS

- Superficial injury to eyelid
- Burns

- Foreign object in eye / eye pain
- Blunt trauma
On-Line Resources

- American Optometric Association
  - www.aoa.org
- Coalition to prevent sports eye injuries
  - www.sportseyeinjuries.com
- Joint statement on eye injuries
  - www.sportseyeinjuries.com/docs/Protective_eyewear.pdf
- Bluminator
  - www.slitlamp.com/ProductList.htm

Join the AOA’s Sports Vision Section today!

Contact information

Dr. Fred Edmunds
585-880-4818
drfred@xtremesight.com
www.xtremesight.com