High School Sports Event Coverage

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Outline

• Emergency Action Plan (EAP)
• Spinal Injuries
• Concussion
• Fracture/Dislocation
• Dental
• Ocular
• ENT
Emergency Action Plan

- Personal
- Equipment
- Communication
- Transportation
- Venue location
- Emergency care facilities
- Documentation

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**EMERGENCY ACTION PLAN TEMPLATE**

*Directions: Fill in the information in column 3 for your location. Also remember to complete the Emergency Contact List and post it by the telephone in the pool area.*

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Signal</td>
<td>Whistle: Blow the whistle&lt;br&gt;Shout: “Emergency! Everyone exit the water!”</td>
<td>Whistle location:</td>
</tr>
<tr>
<td>CHECK the scene and victim</td>
<td>Is it safe to help?&lt;br&gt;Are there life-threatening conditions?&lt;br&gt;For a swimmer in trouble, Reach or Throw, Don’t Go</td>
<td>Reaching equipment and its location:</td>
</tr>
<tr>
<td>CALL for Emergency Medical Assistance, as appropriate</td>
<td>CALL—or have someone else call—9-1-1 or the local emergency number if appropriate</td>
<td>Phone location:</td>
</tr>
<tr>
<td>CARE</td>
<td>Care for the conditions found based on your level of training or as directed by the emergency medical dispatcher or call taker.</td>
<td>Access gate key location:</td>
</tr>
<tr>
<td>Assist with care</td>
<td>Direct someone to open access gates, meet EMS and guide them to pool&lt;br&gt;Return to assist with the emergency care (if you made the call for help).</td>
<td>Return location:</td>
</tr>
<tr>
<td>Important Follow Up</td>
<td>Contact these individuals&lt;br&gt;☑ Parent&lt;br&gt;☑ Relative</td>
<td>Phone list location (if not included on Emergency Contact List):</td>
</tr>
</tbody>
</table>

The American Red Cross urges pool owners to learn how to respond to aquatic emergencies by taking first aid, CPR and water safety courses that include in-water skill practice, such as American Red Cross Basic Water Rescue and Lifeguarding.
Primary Survey

- Airway & cervical spine control
- Breathing
- Circulation
- Disability
- Exposure & environment
Secondary Survey

- Head-to-toe examination
- Ears, eyes, nose, throat, teeth/gums
- Respiratory system
- Cardiovascular system
- Abdominal exam
- MSK exam
- Neurological exam
COLLAPSED ATHLET
Cardiac Causes

- **Structural heart**
  - Hypertrophic cardiomyopathy (HCM)
  - Congenital coronary-artery anomalies
  - Arrhythmogenic right ventricular cardiomyopathy (ARVC)

- **Primary electrical abnormalities**
  - Long QT syndrome
  - Brugada syndrome
  - Wolff-Parkinson White (WPW) syndrome
  - Catecholaminergic polymorphic ventricular tachycardia

- **External causes**
  - Commotio cordis
AED Use

• Single greatest factor affecting survival after out-of-hospital cardiac arrest is the time interval from arrest to defibrillation
• Survival rates have been shown to be 41-74% if bystander CPR is provided and defibrillation occurs within 3-5 minutes of collapse
• Drezner et al looked at the SCA in 2149 high schools over a 2 year period
  – 59 cases of SCA - 42 (71%) of them survived to hospital discharge
  – 34 out of 39 (87%) people survived if a shock was delivered onsite
• Maron et al looked at 128 cases of commotio cordis & found survival rate was 16%
  – 19 of 41 (41%) individuals who received defibrillation survived
CERVICAL SPINE
Cervical Spine Injury

• Requires cervical spine stabilization
  – Unconsciousness or altered level of consciousness
  – Bilateral neurologic findings or complaint
  – Significant midline spine pain with or without palpation
  – Obvious spinal column deformity
Cervical Spine Injury

• Stabilization
  – Ensure the cervical spine is in a neutral position and immediately apply manual stabilization

• Airway
  – Immediately attempt to expose the airway
  – Jaw-thrust recommended over head-tilt technique
Facemask Removal

- Initiate once decision to immobilize & transport has been made
- Cordless screwdriver
- Backup cutting tool
Cervical Stabilization

• When not to move spine into neutral position
  – Movement causes increased pain, neurologic symptoms, muscle spasm or airway compromise
  – It is physically difficult to reposition the spine
  – Resistance is encountered during the attempt at realignment
  – The patient expresses apprehension
Transfer & Immobilization

- 2 techniques
  - Log-roll
  - 8 person lift (lift & slide)
- Use technique that rescuers are familiar with & produces the least amount of spinal movement
- Arms moved to the sides & legs straightened
8 Person Lift

• Requires 8 people
Prone Log-roll
Equipment Removal

• 2015 NATA recommended protective athletic equipment be removed prior to transportation

• Rationale
  – Advances in equipment technology
  – Should be performed by those with highest level of training
  – Expedited access to the athlete for enhanced care
  – Chest access is prioritized

• Need at least 3 experienced rescuers
Equipment Removal
Helmet Removal
Shoulder Pad Removal
CONCUSSION
Sports-Related Concussions

- Definition: traumatically induced transient disturbance of brain function that involves a complex pathophysiological process
- Signs & symptoms cannot be otherwise explained by drug, alcohol, medication use or other injuries (such as cervical injuries or peripheral vestibular dysfunction) or other comorbidities (psychological or medical conditions)
- 1.0–1.8 million SRCs per year in those < 19
  - 400 000 SRCs in high school athletes
Diagnosis

• Complicated – lack of validated, objective diagnostic tests, a reliance on self-reported symptoms, and confounding symptoms caused by other common conditions

• Recommended to have a baseline evaluation
  – SCAT 5
  – Computerized proprietary neuropsychological tests (i.e. Impact)
Immediate Removal

- LOC
- Impact seizure
- Tonic posturing
- Gross motor instability
- Confusion or amnesia
More Serious Head Injury

- Prolonged LOC
- Severe or worsening headache
- Repeated emesis
- Declining mental status
- Focal neurological deficit
- Suspicion of cervical spine injury
SCAT 5

• Standardized approach to sideline evaluation

• Components
  – Symptom checklist *
  – Brief cognitive assessment
  – Brief neurological examination
  – Balance assessment

• Performed in a distraction-free environment
Initial Evaluation

STEP 1: RED FLAGS

RED FLAGS:
- Neck pain or tenderness
- Double vision
- Weakness or tingling/burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

STEP 2: OBSERVABLE SIGNS

<table>
<thead>
<tr>
<th>Witnessed</th>
<th>Observed on Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Balance / gait difficulties / motor incoordination: stumbling, slow / laboured movements</td>
<td>Y</td>
</tr>
<tr>
<td>Disorientation or confusion, or an inability to respond appropriately to questions</td>
<td>Y</td>
</tr>
<tr>
<td>Blank or vacant look</td>
<td>Y</td>
</tr>
<tr>
<td>Facial injury after head trauma</td>
<td>Y</td>
</tr>
</tbody>
</table>

STEP 3: MEMORY ASSESSMENT

MADDOCKS QUESTIONS
"I am going to ask you a few questions, please listen carefully and give your best effort. First, tell me what happened!!"

Mark Y for correct answer / N for incorrect

What venue are we at today? | Y | N
Which half is it now? | Y | N
Who scored last in this match? | Y | N
What team did you play last week / game? | Y | N
Did your team win the last game? | Y | N

STEP 4: EXAMINATION

GLASGOW COMA SCALE (GCS)

<table>
<thead>
<tr>
<th>Time of assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of assessment</td>
</tr>
<tr>
<td>Best eye response (E)</td>
</tr>
</tbody>
</table>
No eye opening
Eye opening in response to pain | 2 | 2 | 2 |
Eye opening to speech | 3 | 3 | 3 |
Eyes opening spontaneously | 4 | 4 | 4 |
Best verbal response (V) | 1 | 1 | 1 |
No verbal response
Incomprehensible sounds | 2 | 2 | 2 |
Inappropriate words | 3 | 3 | 3 |
Confused | 4 | 4 | 4 |
Oriented | 5 | 5 | 5 |
Best motor response (M) | 1 | 1 | 1 |
No motor response
Extension to pain | 2 | 2 | 2 |
Abnormal flexion to pain | 3 | 3 | 3 |
Flexion / Withdrawal to pain | 4 | 4 | 4 |
Localizes to pain | 5 | 5 | 5 |
Obeys commands | 6 | 6 | 6 |

Glasgow Coma score (E + V + M)

CERVICAL SPINE ASSESSMENT

Does the athlete report that their neck is pain free at rest? | Y | N
If there is NO neck pain at rest, does the athlete have a full range of ACTIVE pain free movement? | Y | N
Is the limb strength and sensation normal? | Y | N
# Symptom Check

## STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read this instruction paragraph out loud then complete the symptom scale. For the baseline assessment, the athlete should rate his/her symptoms based on how he/she typically feels and for the post injury assessment the athlete should rate their symptoms at this point in time.

Please Check: □ Baseline □ Post-Injury

*Please hand the form to the athlete*

<table>
<thead>
<tr>
<th>Symptom</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&quot;Pressure in head&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Neck Pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Balance problems</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling like &quot;in a fog&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&quot;Don’t feel right&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue or low energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Confusion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More emotional</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous or Anxious</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling asleep (if applicable)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total number of symptoms:** 22

**Symptom severity score:** 132

Do your symptoms get worse with physical activity? Y N

Do your symptoms get worse with mental activity? Y N
Cognitive Screening

**STEP 3: COGNITIVE SCREENING**

*Standardised Assessment of Concussion (SAC)*

**ORIENTATION**

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>What month is it?</td>
<td>0</td>
</tr>
<tr>
<td>What is the date today?</td>
<td>0</td>
</tr>
<tr>
<td>What is the day of the week?</td>
<td>0</td>
</tr>
<tr>
<td>What year is it?</td>
<td>0</td>
</tr>
<tr>
<td>What time is it right now?</td>
<td>0</td>
</tr>
</tbody>
</table>

Orientation score of 5

**IMMEDIATE MEMORY**

The Immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimise any ceiling effect. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose EITHER the 5 or 10 word list groups and circle the specific word list chosen for this test.

I am going to test your memory, I will read you a list of words and when I am done, repeat back as many words as you can remember, in any order. For Trials 2 & 3, I am going to repeat the same list again. Repeat back as many words as you can remember in any order, even if you said the word before.

<table>
<thead>
<tr>
<th>List</th>
<th>Alternate 5 word lists</th>
<th>Score (of 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Finger</td>
<td>Penny</td>
</tr>
<tr>
<td>B</td>
<td>Candle</td>
<td>Paper</td>
</tr>
<tr>
<td>C</td>
<td>Baby</td>
<td>Monkey</td>
</tr>
<tr>
<td>D</td>
<td>Elbow</td>
<td>Apple</td>
</tr>
<tr>
<td>E</td>
<td>Jacket</td>
<td>Arrow</td>
</tr>
<tr>
<td>F</td>
<td>Dollar</td>
<td>Honey</td>
</tr>
</tbody>
</table>

Immediate Memory Score of 15

Time that last trial was completed
# Concentration

## Digits Backwards

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-1-9, you would say 9-1-7.

<table>
<thead>
<tr>
<th>Concentration Number Lists (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>List A</td>
</tr>
<tr>
<td>4-9-3</td>
</tr>
<tr>
<td>6-2-9</td>
</tr>
<tr>
<td>3-8-1-4</td>
</tr>
<tr>
<td>3-2-7-9</td>
</tr>
<tr>
<td>6-2-9-7-1</td>
</tr>
<tr>
<td>1-5-2-8-6</td>
</tr>
<tr>
<td>7-1-8-4-6-2</td>
</tr>
<tr>
<td>5-3-9-1-4-8</td>
</tr>
</tbody>
</table>

## Months in Reverse Order

Now tell me the months of the year in reverse order. Start with the last month and go backward. So you'll say December, November. Go ahead.


<table>
<thead>
<tr>
<th>Months Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 of 1</td>
</tr>
</tbody>
</table>

## Concentration Total Score (Digits + Months)

<table>
<thead>
<tr>
<th>Concentration Total Score (Digits + Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 of 5</td>
</tr>
</tbody>
</table>
# Neurological Exam

## STEP 4: NEUROLOGICAL SCREEN

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

<table>
<thead>
<tr>
<th>Question</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can the patient read aloud (e.g. symptom checklist) and follow instructions without difficulty?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Does the patient have a full range of pain-free PASSIVE cervical spine movement?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Without moving their head or neck, can the patient look side-to-side and up-and-down without double vision?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Can the patient perform the finger nose coordination test normally?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Can the patient perform tandem gait normally?</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
**STEP 5: DELAYED RECALL:**

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

*Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order.*

---

**Time Started**

---

Please record each word correctly recalled. Total score equals number of words recalled.

---

**Total number of words recalled accurately:** 

of 5 or 

of 10
Types of errors
1. Hands lifted off iliac crest
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip into > 30 degrees abduction
5. Lifting forefoot or heel
6. Remaining out of test position > 5 sec
**STEP 6: DECISION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Date &amp; time of assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom number (of 22)</td>
<td></td>
</tr>
<tr>
<td>Symptom severity score (of 132)</td>
<td></td>
</tr>
<tr>
<td>Orientation (of 5)</td>
<td></td>
</tr>
<tr>
<td>Immediate memory (of 15 of 30)</td>
<td></td>
</tr>
<tr>
<td>Concentration (of 5)</td>
<td></td>
</tr>
<tr>
<td>Neuro exam</td>
<td>Normal Abnormal Normal Abnormal Normal Abnormal</td>
</tr>
<tr>
<td>Balance errors (of 30)</td>
<td>of 5 of 10 of 5 of 10</td>
</tr>
<tr>
<td>Delayed Recall</td>
<td>of 5 of 10 of 5 of 10</td>
</tr>
</tbody>
</table>

Date and time of injury:

If the athlete is known to you prior to their injury, are they different from their usual self?
- Yes
- No
- Unsure
- Not Applicable

If different, describe why in the clinical notes section.

Concussion Diagnosed?
- Yes
- No
- Unsure
- Not Applicable

If re-testing, has the athlete improved?
- Yes
- No
- Unsure
- Not Applicable

I am a physician or licensed healthcare professional and have personally administered or supervised the administration of this SCAT5.

Signature: ____________________________
Name: ________________________________
Title: ________________________________
Registration number (if applicable): _______________
Date: ________________________________

**SCORING ON THE SCAT5 SHOULD NOT BE USED AS A STAND-ALONE METHOD TO DIAGNOSE CONCUSSION, MEASURE RECOVERY OR MAKE DECISIONS ABOUT AN ATHLETE’S READINESS TO RETURN TO COMPETITION AFTER CONCUSSION.**
Signs to Watch for

- Worsening headache
- Drowsiness or inability to be awakened
- Inability to recognize people or places
- Repeated vomiting
- Unusual behavior or confusion or irritable
- Seizures (arms and legs jerk uncontrollably)
- Weakness or numbness in arms or legs
- Unsteadiness on their feet.
- Slurred speech
80%–90% of concussed older adolescents and adults return in 2 weeks & younger athletes in 4 weeks
# CIF Return to Sport

<table>
<thead>
<tr>
<th>Date &amp; Initials</th>
<th>Stage</th>
<th>Activity</th>
<th>Exercise Example</th>
<th>Objective of the Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No physical activity for at least 2 full symptom-free days <strong>AFTER</strong> you have seen a physician</td>
<td>No activities requiring exertion (weight lifting, jogging, P.E. classes)</td>
<td>Recovery and elimination of symptoms</td>
<td></td>
</tr>
</tbody>
</table>
| II-A            | Light aerobic activity | 10-15 minutes of walking or stationary biking  
Must be performed under direct supervision by designated individual | Increase heart rate to no more than 50% of perceived max. exertion (e.g., < 100 beats per minute)  
Monitor for symptom return |
| II-B            | Moderate aerobic activity  
Light resistance training | 20-30 minutes jogging or stationary biking  
Body weight exercises (squats, planks, push-ups), max 1 set of 10, no more than 10 min total | Increase heart rate to 50-75% max. exertion (e.g., 100-150 bpm)  
Monitor for symptom return |
| II-C            | Strenuous aerobic activity  
Moderate resistance training | 30-45 minutes running or stationary biking  
Weight lifting ≤ 50% of max weight | Increase heart rate to > 75% max. exertion  
Monitor for symptom return |
| II-D            | Non-contact training with sport-specific drills  
No restrictions for weightlifting | Non-contact drills, sport-specific activities (cutting, jumping, sprinting)  
No contact with people, padding or the floor/mat | Add total body movement  
Monitor for symptom return |

**Minimum of 6 days to pass Stages I and II.** Prior to beginning Stage III, please make sure that written physician (MD/DO) clearance for return to play, after successful completion of Stages I and II, has been given to your school's concussion monitor.

| III              | Limited contact practice  
Full contact practice | Controlled contact drills allowed (no scrimmaging)  
Return to normal training (with contact) | Increase acceleration, deceleration and rotational forces  
Restore confidence, assess readiness for return to play  
Monitor for symptom return |

**MANDATORY: You must complete at least ONE contact practice before return to competition.**

(Highly recommend that Stage III be divided into 2 contact practice days as outlined above.)

| IV               | Return to play (competition) | Normal game play | Return to full sports activity without restrictions |
DISLOCATION
Dislocations

• 3.6% of the 2.6 million sports and recreational-related injuries annually

• 3 most common
  – Shoulder (54.9%)
  – Wrist/hand (16.5%)
  – Knee (16%)
Dislocations

• Most are nonemergent and can be managed on the sideline
• Neurovascular status is the initial & most important step
• On the-field attempt to restore neurovascular status to the compromised extremity is reasonable and encouraged
• Multiple attempts should not be performed unless emergency transport to the appropriate facility is unavailable for a substantial amount of time
Shoulder Dislocation

- 95% dislocate anteriorly
- Present with arm slight abducted & internally rotated
- Shoulder loses normal rounded appearance
- Different reduction techniques
- Best to reduce off the field
Reduction Techniques

- Traction-countertraction
- Chair method
- Spaso method
- Milch method
- Stimson method
- Kocher method
- Scapular manipulation
- External rotation
- Fast, Reliable, and Safe (FARES)

*Axillary Nerve & pulses checked before & after*
Traction-countertraction
Spaso method
Milch method
Stimson Method
Kocher Method
Scapular manipulation
Systematic Comparison

Reduction success

Reduction success (%)

Kocher, Spaso, External rotation, Milch, Chair, Traction-countertraction, Scapular manipulation, Stimson, FARES, Hippocratic
Pain during reduction with 95% confidence interval
Elbow Dislocation

- Fall on an outstretched hand with the elbow slightly flexed
- Posterior and posterolateral dislocations account for 80 to 90%
- Quickly assess neurovascular structures
- Evaluate for possible concomitant fracture
- Most commonly occurs in football & wrestling
Elbow Reduction
Elbow Reduction

Extend Wrist
PIP Joint Dislocation

• Most common type of finger dislocation
  – Dorsal most common direction
• Reduction - axial traction, slight hyperextension, and direct pressure on the base of the middle phalanx
• RTP - if have minimal pain, no neurovascular compromise, full active PIP extension, and/or no rotation deformity
  – Buddy tape
Patellar Dislocation

- **Mechanism**
  - Twisting injury with the foot planted
  - Direct blow to the knee
- **Reduction** – press patella medially while extending the knee
- **RTP** – Need full ROM, normal strength & function and minimal or no pain
  - return to play in a patellar stabilizer brace
Patella Reduction
Fracture

- Clavicle
- Ankle
- Finger
- Scaphoid
- Hamate
- Distal radius/ulna
- Pelvic avulsion
- Stress fractures
- Growth plate injury
Ottawa Ankle Rule

A series of ankle x-ray films is required only if there is any pain in malleolar zone and any of these findings:
- Bone tenderness at A
- Bone tenderness at B
- Inability to bear weight both immediately and in emergency department

A series of ankle x-ray films is required only if there is any pain in mid-foot zone and any of these findings:
- Bone tenderness at C
- Bone tenderness at D
- Inability to bear weight both immediately and in emergency department

Fig 1 Ottawa ankle rules
DENTAL INJURIES
Tooth Avulsion

- Replace tooth as quickly as possible
- Use Storage medium if unable to replace
- Handle tooth by the crown
- Do not replace primary teeth
Storage Mediums

Instructions:
1. Unscrew cap and remove the foil safety seal.
2. Pick up tooth by the enamel, carefully drop it in the container.
3. Screw the lid back on.
4. Immediately call your dentist or go directly to an emergency room.

Save-A-Tooth® Will Preserve Knocked Out Teeth For 24 Hrs.
Dental Fracture

- Not an emergency
- Can reduce if significant luxation
- Can cover fx with composite adhesive or OTC crown repair cement
- Patient comfort is limiting factor

<table>
<thead>
<tr>
<th>Type</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No trauma</td>
</tr>
<tr>
<td>I</td>
<td>Simple fracture of crown, involving little or no dentin</td>
</tr>
<tr>
<td>II</td>
<td>Extensive fracture of crown, involving considerable dentin, not the pulp</td>
</tr>
<tr>
<td>III</td>
<td>Extensive fracture of crown, involving considerable dentin, exposing pulp</td>
</tr>
<tr>
<td>IV</td>
<td>Nonvital tooth, without loss of crown structure</td>
</tr>
<tr>
<td>V</td>
<td>Total tooth loss</td>
</tr>
<tr>
<td>VI</td>
<td>Displacement of tooth, without fracture of crown or root</td>
</tr>
</tbody>
</table>

[Ellis Class 1 to Ellis Class 5 diagrams]
OCULAR INJURIES
Ocular Injuries

Most Common
- “Black Eye”
- Eyelid Laceration
- Subconjunctival Hemorrhage
- Corneal abrasion
- Foreign Body
- Hyphema
- Traumatic iritis
- Orbital fracture

Eye Emergencies
- Corneal Laceration
- Retinal Detachment
- Lens Dislocation
- Blowout Fracture of the Orbit
- Ruptured Globe
- Optic Nerve Injury
Epidemiology

• Eye trauma
  – #1 Cause of non-congenital blindness <20yo
  – #4 Cause of visual loss <46yo
• 42,000 sports-related eye injuries evaluated in the ED annually
  – 72% occur in patients < 25
• 25% of all severe eye injuries are sports related
• 1.5% of sports injuries involve the eye\(^2\)
• Approximately 90% of sports related eye injuries are preventable\(^3\)

2 Olson DE, Sikka RS, Pulling T et al. Netter’s Sports Medicine. 2010
3 Pieper P. J Emerg Nurs. 2010
Emergency Eye Kit

- Pocket Snellen chart
- Ophthalmoscope & or Penlight (with blue)
- Fluorescein strip
- Cotton-tip applicators
- Normal saline or water for irrigation
- Eye shield/patch
History

• Mechanism of Injury
• Symptoms
  – pain
  – decreased / loss of vision
  – diplopia
  – flashing lights/halos
  – floaters
  – PMH of eye disease / eye surgery
Brief Physical Exam

• Inspection & Palpation
• * Visual Acuity *
• Rule out obvious globe rupture
  – uvea protruding through laceration
  – distorted pupil
  – irregular iris
• Pupil size & if there is RAPD
• Extraocular eye movements
Detailed Physical Exam

• Eyelids/Orbit
  – symmetry
  – ptosis
  – proptosis
  – lacerations
  – fractures
  – sensation
  – lid closing/opening

• Pupil
  – dilated/asymmetric

• Conjunctiva
  – hemorrhage

• Sclera
• Iris
  – irregular
• Visual Fields
• Cornea/Anterior Chamber
  – hyphema
  – fluorescein
    • abrasions
    • foreign body

• EOM
  – restricted movement
  – report of diplopia
Detailed Physical Exam

- Direct Ophthalmoscope
  - fundus
  - red reflex
  - disk
  - vessels
  - macula

- Slit Lamp Exam
When to Refer

- Need for further evaluation (slit lamp)
- Unable to do thorough exam
- Severe injuries in need of further treatment
- Red flags
Examination Red Flags

- Loss of visual acuity
- Visual field cuts
- Hyphema
- Change in pupil
- Eye protrusion
- Orbit Asymmetry
- Abnormal mass on inspection

- Severe photophobia
- Light flashes or halos
- Complicated lacerations
- Abnormal EOM or pain with EOM
- Diplopia
- Persistent discomfort
Hyphema

- Most common intraocular injury
- Blood in the anterior chamber
- Iris is torn either at the pupil margin or the iris root
- Sx = blurred vision, photophobia & pain
- PE = Complete eye exam including **intraocular pressure** & slit-lamp
- Red blood cells floating would suggest a microhyphema
Hyphema Treatment

• Immediate ophthalmology referral
  – Strict bed rest with HOB 30 degrees
  – Eye shield – to decrease risk of re-bleed
  – NO NSAIDS
  – Daily f/u with ophtho to assess IOP
  – Restrict activity for 5-6 days – risk of re-bleed
• RTP = when resolved
Corneal Abrasion

- Most common eye injury in sports
- Damage to surface epithelium
- Sx = sharp pain, photophobia, tearing & foreign body sensation
  - PE = Full eye exam including upper lid to exclude foreign body
    - Fluorescein dye & cobalt blue light
    - Exam may require topical anesthetic drop
Corneal Abrasion

- **Tx** = Removal foreign body
  - Topical antibiotic
  - No need for patch
  - f/u if worsening/persistent symptoms
  - No contact lenses during treatment
- **RTP** = when completely heals (usually within 3 days)
Subconjunctival Hemorrhage

- Very common after blunt trauma
- Sx = usually painless, may have mild irritation & red eye
- PE = Blood does no obscure pupil/iris
  - Assessment mainly focuses on r/o ruptured globe or foreign body
- Tx = Reassurance to the athlete
  - Most hemorrhages resolve in 2-3 weeks
- RTP = immediately w/o restrictions
Retinal Detachment

- Usually after direct trauma to the orbit or from significant head trauma
- Sx = complain of floaters or flashing lights, may have blind spot on edge of visual field, decreased vision
  - Can occur remote to trauma or hours after
- PE = must check confrontational visual field for defects
  - Afferent pupil defect may be present if there is a large area of detachment
- Funduscopic exam – may be hard to see detachment
Retinal Detachment

- **Tx** = immediate eye protection
  - Immediate referral to ophtho for dilated exam
  - Can include laser (tears or holes) or surgery (detachment)
- **RTP** = when released by ophthalmologist
  - Depends on extent of the damage
  - 2 weeks is the minimum out of activity
Orbital Wall Fracture

• Seen after significant blunt eye trauma
• Symptoms
  – Localized pain & swelling
  – Change in visual acuity
  – Diplopia or numbness
  – Crepitus with nose blowing
• Exam
  – May have restricted EOM
  – Numbness to cheeks
  – Pain over orbit & sunken orbit
Orbital Wall Fracture

• **Evaluation**
  - CT scan (fine cuts)

• **Treatment** = Eval by ophtho
  - PO antibiotics & nasal decongestant
  - Ice, avoid nose blowing

• **Surgical indications**
  - Globe malposition
  - Enophthalmos
  - Large fracture
  - Muscle entrapment

• **RTP** = Clearance from eye specialist
Ruptured Globe

- Occur from direct trauma to the orbit or significant head trauma
- Sx = may complain of vision loss or eye pain
  - Can have similar symptoms to retinal detachment
- PE = NO PRESSURE TO THE GLOBE
  - Uvea protruding
  - Irregular or non-reactive pupil
  - Decreased visual acuity
  - No red reflex
Ruptured Globe

- Tx = Cover immediately (no pressure to globe) and send for immediate ophtho exam
  - DO NOT attempt to remove penetrating object
  - Make NPO – high probability for surgical exploration & repair
  - Keep supine/upright
  - No nose blowing
  - Anti-emetics
- RTP = in conjunction with an ophthalmologist
Eye Shields
NASAL TRAUMA
Nasal Fracture

- Most common facial fracture
- Evaluate for periorbital findings
- No need for imaging if isolated
- Reductions are best performed non-emergently
Septal Hematoma
Return to Play

- Full ROM without pain
- 90% strength vs uninvolved side
- Normal neurovascular status
- Normal proprioception
- Functional tests
  - Cardiovascular fitness
  - Sport-specific testing
- Desire to return (psychological)
Lower Extremity Functional Tests

- Toe Raises
- Single leg hops
- Four squares
- Mini squats
- Duck walk

- Cutting drills/figure 8
- Carioca
- Single leg hop for distance
- Triple hop for distance
Upper Extremity Functional Tests

• Against wall
  – Wall push up
  – Two hand ball balance
  – Single arm ball balance

• On Floor
  – Push up
  – Two hand ball balance/ball push up
  – Plyo-push up
  – Wheelbarrow
  – Plank
References