GUIDELINES FOR PEDIATRICIANS

HEAD INJURIES

Issue 1

American Academy of Pediatrics

EPIDEMIOLOGY

- 20% of the 1.5 million head injuries sustained in the United States each year are sports-related.
- Approximately one tenth of sports-related injuries require hospitalization.
- 20% of high school football players and 40% of college football players will sustain a head injury at some point in their careers.
- Those who have sustained a head injury are at 2 to 4 times greater risk of recurrence.

TERMINOLOGY

- **Closed-head injury without structural defect** (concussion)
  Grade I – Transient confusion, no loss of consciousness (LOC), lasts < 15 minutes
  Grade II – Transient confusion, no LOC, lasts > 15 minutes
  Grade III – LOC
  Grades I and II concussions are frequent in sports, and are commonly called mild traumatic brain injuries (MTBI)
- **Closed-head injury with structural defect** (epidural/subdural hemorrhage) – uncommon in sports

EVALUATION

MTBI is an evolving process, not a static event. It should be evaluated on an ongoing basis with serial examinations.

IMMEDIATE ON-SITE EVALUATION

- Often done by athletic trainer or other sideline medical professional, including a physician
- Evaluation of "3Cs" – cognition, coordination, and cranial nerves – after evaluation of ABCs (see Standardized Assessment of Concussion[1] guidelines)
- Early signs including confusion, disorientation, amnesia, headache, nausea, vomiting, motor deficits

RETURN TO PLAY GUIDELINES ASSUME ABSENCE OF SYMPTOMS INCLUDING PROVOCATIVE STRESS TEST RESULTS

- Grade I – mild – no LOC, no amnesia or confusion (return to play after 20 minutes)
- Grade II – moderate – no LOC, some confusion and amnesia > 15 minutes (return to play after 1 week)
- Grade III – severe – LOC (return to play after 1 month) – With LOC, assume cervical spine injury and stabilize appropriately until proven otherwise

INDICATIONS FOR EMERGENCY MEDICAL AND RADIOGRAPHIC EVALUATION

Visual changes (diplopia, blurry vision, anisocoria); numbness, weakness or asymmetry of an extremity; or progressive headache, intractable vomiting suggest the need for immediate evaluation with consideration of computed tomography (within first 24-28 hours) or magnetic resonance imaging (if after 72 hours).

COMPLICATIONS

- ***Postconcussive syndrome***, with physical, emotional, and/or cognitive symptoms that may persist for a year or more. Commonly found signs include decreased mental processing speed, decreased short-term memory and attention span, irritability, fatigue, sleep disturbance, persistent headache, and a general "foggy" feeling.
- ***Decreased cognitive functioning*** – cognitive function testing by a neuropsychologist may be helpful. Repeated concussions appear to have a cumulative effect and may lead to long-term sequelae such as decreased cognitive functioning.
- ***Second impact syndrome*** (SIS) – caused by increased intracranial pressure due to loss of vascular autoregulation; may lead to herniation and death with even a mild second injury to a symptomatic athlete.

TREATMENT PRINCIPLES

- ***NO SYMPTOMATIC PLAYER SHOULD EVER BE PERMITTED TO RETURN TO PLAY!*** Persistent symptoms suggest continued abnormal cerebral blood flow and increased risk for SIS.
- Know concussion grades and insist that "return to play" guidelines be observed. Three significant head injuries in a season suggest that the athlete should not return to play for the remainder of the season ("Three strikes and you're out").
- Ensure that information is available on the best equipment, especially properly fitted headgear, and advocate for a safe playing environment.
- Encourage safe technique – no head-down tackling (spearing); no diving into unknown water; no use of trampolines; use of helmets for all biking and street skating.
- Not all confusion, disorientation, and head pain is caused by trauma – consider other possible diagnoses such as heat/altitude sickness, dehydration, medication reaction, or hypoglycemia.

Doctor: This side of "Sports Shorts" is for your use; flip side is for photocopying and giving to your patient

Reference:

1. McCrea M, Kelly J, Randolph C. *The Standardized Assessment of Concussion (SAC): Manual for Administration, Scoring and Interpretation.* ed 1. Alexandria, VA: The Brain Injury Assoc; 1997

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GUIDELINES FOR PARENTS AND ATHLETES

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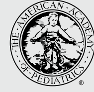

Head injuries are among the most serious types of injuries that occur among athletes. Fortunately, serious injuries are rare. Careful attention to any head injury by parents, coaches, and medical professionals can help prevent complications from developing.

STATISTICS

- 20% of the 1.5 million head injuries that occur in the United States each year are sports-related.
- Approximately one tenth of sports-related injuries require hospitalization.
- 20% of high school football players and 40% of college football players will get a head injury at some point in their career.
- Those who have had a head injury are at 2 to 4 times greater risk of having another.

DEFINITIONS

- **Concussion** refers to a head injury in which there is bruising of the brain, but not permanent damage or bleeding. It may occur with or without loss of consciousness. Common symptoms include:
  - Confusion
  - Headache
  - Nausea
  - Vomiting
  - Dizziness
  - Unsteadiness
  - Feeling "in a fog"

  Concussions are divided into three classes:

  Grade I – mild (confused but not knocked out); may return to play after 20 minutes if symptoms clear completely

  Grade II – moderate (confused with memory loss); may play after 1 week if all symptoms clear completely

  Grade III – severe (knocked out); may play after 1 month if all symptoms clear completely
- **Skull fractures** are uncommon and are unrelated to brain damage or concussion.
- **Brain damage** from head injuries is uncommon in sports.

After any significant head injury, the athlete should NOT be left alone and for the first 24 hours should be awakened every 2-3 hours during sleep to be checked.

WHAT TO WATCH FOR AFTER A HEAD INJURY

Normal signs in the first 2 days include:

- Fatigue and desire for extra sleep (but can be easily awakened during sleep)
- Headache (should be fairly mild and not worsening)
- Nausea and vomiting (occasional – *not* persistent)
- Problems with thinking, concentration, and attention span (this may persist for up to a year or more)

Signs that suggest the need for immediate medical attention include:

- Marked change in personality – often with confusion and irritability
- Worsening headache, especially if associated with nausea or vomiting
- Numbness, tingling, or weakness in the arms or legs, changes in breathing pattern, or seizure
- Eye and vision changes (double vision, blurred vision, unequal-sized pupils)

PREVENTING HEAD INJURIES

- Understand grades of concussions and follow "return to play" guidelines above.
- A player with symptoms should *never* be permitted to return to play!
- Insist on the best possible equipment (especially properly fitted head gear) and WEAR IT!
- Always follow safe sports techniques and avoid risks – no head-down tackling (spearing); no diving into water of unknown depth; use care during gymnastic routines; avoid use of trampolines; wear a helmet for all biking and street skating.
- Follow-up with your pediatrician after ANY head injury.

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