



James W. Melisi, M.D., Neurosurgeon

Concussion in Children and Young Adults: When to Return to Play?

Objectives: Determine return-to-play guidelines on basis of severity of head injury

One of the most common athletic head injuries is concussion. While common in all age groups, it is of particular concern in children and young adults because of the potential life-long consequences. Up to 70% of traumatic deaths and 20% of permanent disabilities occur from head injury among those pursuing athletic and recreational activities. It is obvious, then, that proper recognition, treatment and prevention of head injury is important. It is estimated that more than 1.3 million high school students participate in contact sports annually. About 7% of high school football players suffer at least one concussion each season. Data suggest over 62,000 cases of concussion a year occur among high school students alone. In treating young athletes who have sustained a concussion, it becomes important to counsel when to allow return to play and normal activities. Unlike severe head trauma, no radiographic or laboratory means are available for tracking progress in the patient who has suffered a concussion. This newsletter discusses pathophysiology, grading, and treatment of concussion and provides return-to-play guidelines for the young athlete.

The cardinal feature of all concussions is the post-traumatic alteration of mental status with or without loss of consciousness. Confusion and amnesia are present to some degree. Anyone who has lost consciousness, no matter how brief, has had a concussion.

Headache, disorientation, "blank stare," delayed verbal response to questions, and short term memory loss are other common features that may be present.

Mechanism of Injury

Concussions result from acceleration-deceleration injuries causing rapid rotation of the head. This results in shearing forces deep within the brain including the brainstem, corpus callosum and cerebellum. Notably, a direct blow to the head is not always necessary to cause such shearing injuries. For example, a blow to the torso can cause concussion from brain acceleration from a whiplash effect of the cervical spine. Within 24 hours of a concussion, the brain enters a period of metabolic depression that can last as long as 10 days. The goal in evaluation and treatment of these patients is to avoid second insults while providing an optimum environment for recovery.

There are two acute potential sequelae of concussion. The first and most serious is Second Impact Syndrome (SIS). It occurs when a person suffers an initial concussion, followed by a second, often less serious head injury before the first injury has completely resolved. Shortly after this second injury, the person exhibits signs and symptoms of increased intracranial pressure (ICP) such as dilated pupils, posturing, loss of consciousness and respiratory arrest. If untreated, death may ensue. Failed autoregulation of cerebral blood flow is believed to be the cause leading to a herniation syndrome. Response to treatment is poor.

The best management is prevention. No athlete should return to play or practice until he or she is absolutely symptom free from the first injury. The second acute complication of concussion is Diffuse Cerebral Swelling (DCS). Different from SIS, it can develop after the initial injury. Within minutes to several hours after a concussion, the patient shows signs of neurologic deterioration. Again, this may end in death. A mass lesion has to be ruled out in these patients since DCS mimics the "talk and die" syndrome seen with acute epidural hematoma. All young athletes who sustain even minor head trauma should therefore be observed closely by a responsible adult for the remainder of the day. Immediate neurosurgical intervention to lower increased ICP may be necessary as soon as neurologic deterioration is observed.

Post-concussive syndrome, neuropsychological impairment, and posttraumatic migraine are common chronic sequelae of concussion. In post-concussive syndrome, headache, personality change, concentration and memory problems, nausea, fatigue and dizziness may last for several months.

CONCUSSION GRADING SCALE

- Grade 1 (Mild)
- Grade 2 (Moderate)
- Grade 3 (Severe)

No LOC or PTA < 1hr. LOC < 5 min or PTA 1-24 hrs. LOC > 5 min or PTA > 24 hrs.

*LOC – loss of consciousness;
PTA – posttraumatic amnesia for events before or after concussion*

Return to Play Guidelines After Concussion

A common problem faced by physicians, coaches and parents when confronted with a head injury is when to allow a young athlete to return to activity or competition. Timing is based in general on the severity of the injury. No child should return if they remain symptomatic because of the risk of SIS. The following table provides guidelines for those whose symptoms improve.

First Concussion Second Concussion

Grade 1

No activity for 7 days, return to play if asymptomatic.
No activity for 4 weeks, return to play if asymptomatic for last 7 days

Grade 2

No activity for 4 weeks, return to play if asymptomatic for last 7 days. Terminate season, no contact sports for next season, return to play the following season

Grade 3

No activity for 4 weeks, return to play if asymptomatic for last 7 days. Terminate season, ban contact sports, return to play noncontact sports after following season

It is not likely that a young person's future rests on his ability to perform in a contact sport. Furthermore, a ban on contact sports does not mean a ban on all activity. Noncontact sports should be encouraged for the person who has recovered from a severe concussion. The physical and psychological benefits of sports remain important and efforts should be made to introduce alternative activities. Finally, the single most effective treatment of head injury remains prevention of the injury itself.

Please feel free to photocopy this newsletter for distribution to patients. Thank you.

FIRST-CLASS MAIL
U.S. POSTAGE PAID
FAIRFAX, VA
PERMIT NO. 2807

ADDRESS SERVICE REQUESTED.



Neurological & Spinal Surgery

Yorktown 50 Building
8316 Arlington Blvd., Suite 640
Fairfax, VA 22031-5216

☎ 703-208-0820

☎ Toll-free: 1-866-207-1182

Email: jmelisi-md.com

Procedures Performed by James W. Melisi, MD, FACS, PLLC

Spinal Procedures:

- Lumbar, thoracic and cervical disc herniation surgery
- Complex spinal fusion for trauma, instability, spondylolisthesis
- Procedures for spinal stenosis, spinal cord compression, tumors

Intracranial Procedures:

- Benign and malignant tumors of the brain
- Stereotactic brain biopsy
- Pituitary tumors
- Surgical treatment for Trigeminal Neuralgia
- Skull base surgery
- Neurovascular disease (AVM, aneurysms of the brain)

Peripheral Neuropathy:

- Surgery for Carpal Tunnel Syndrome and ulnar neuropathy

Hospital Affiliations:

Active Staff:

InovaFairfax Hospital
InovaFairOaks Hospital
ColumbiaReston Hospital
Arlington Hospital

Courtesy Privileges:

Loudoun Hospital

Dr. Melisi accepts most insurance plans. To find out if he accepts yours, please call his billing office at (703) 208-0820.