Postconcussion Syndrome: A Case Study

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Over the years there has been little change in the treatment of head injuries to athletes (American Academy, 1991). In recent years we have seen a renewed emphasis on the prevention, care, and rehabilitation of internal head injuries, particularly on the screening and evaluation of athletes injured in collision sports. It is no longer a badge of courage for an athlete to suffer a minor head injury, “shake it off,” and return to competition. Being “dinged” can no longer be dismissed as acceptable in football.

From youth football to the ranks of the NFL, concussions have not been taken seriously. “How long will he be out?” has usually been the major concern. And “as soon as the fuzziness is gone, put him back in” has been the principle management.

Football players often refuse to give up the game for recurring concussions. Their first preference is to change to a position that is assumed to have less chance of injury (linebacker to fullback, or even defensive back to punter). The effect of repeated head injuries is cumulative and often irreversible (Kelly, 1994). This is demonstrated by the fact that numerous athletes, particularly football players, are forced to retire because of repeated concussions and their residual effects.

The following is a case report of a professional football player who had to end his playing career due to repeated concussions and the effects of these injuries on his daily life.

The Final Injury

A 29-year-old NFL running back received a blow to the head from the knee of an opponent during the fifth game of the regular season. He did not lose consciousness and was able to leave the field under his own power, but he was noticeably dizzy and disoriented while walking to the sideline. Immediate evaluation by the team physician revealed that the player was dizzy, confused, and had retrograde amnesia. He did not have any clinical symptoms of cervical or lumbar injury. Over the next 5 minutes his speech deteriorated and he complained of nausea. The player was taken to the locker room and transported by ambulance to the emergency room.

In the emergency room the player’s vital signs indicated a blood pressure of 140/92 and a pulse of 76. But he was still confused and continued to have retrograde amnesia and poor mental function. Cervical spine radiographs were normal. The player was admitted to the hospital for observation and follow-up testing.

Approximately 3 hours following the injury, the player was evaluated by a neurosurgeon. He remembered nothing of the game that afternoon and was only able to state his name and that he was in the hospital. He was diagnosed as having a severe concussion. The CT scan and MRI showed no hemorrhage or cerebral edema. Reexamination the next morning revealed that the athlete was still suffering the effects of a severe concussion. He was released from the hospital that day.

The athlete was seen by a neurosurgeon 4 and 8 days following the injury. He continued to be very confused and complained of persistent headaches. He had difficulty with cognitive abilities and memory; he also had trouble concentrating and orienting himself in time and place.

Mild antrograde amnesia was demonstrated by poor recall of previous events. Short-term memory was also affected. The athlete was subsequently evaluated by a neurologist specializing in brain injuries.

Following a battery of mental status tests, both physicians agreed with the diagnosis of postconcussion syndrome (G.R. Cybulski, assoc. prof. of neurosurgery, Northwestern Univ. Medical School, personal communication, Oct. 17, 1994).
The running back had a history of episodes of mild brain trauma. He had suffered 4 injuries over the past 11 years; each injury was worse in symptoms and duration. At the age of 18 he had experienced a very mild concussion during football practice, but he returned to practice that day without incident.

He continued playing football in college and later in the NFL. His second concussion of record was during his second season in the NFL, 6 years after his initial injury. This also was categorized as mild, but he did not continue playing that day due to a slight headache and dizziness. He returned to participation the following day, however.

The athlete’s third concussion occurred during a regular season game 2 years later. He received a direct blow but did not lose consciousness. He reported to the bench confused and suffering retrograde amnesia, and was taken to the locker room. Within an hour, all symptoms subsided except for a headache. The athlete was examined by the team physician after the game and again the next day. He was asymptomatic and returned to full activity.

His fourth concussion occurred 6 weeks prior to the episode described at the beginning. While being tackled, the running back sustained a direct blow to the head and experienced brief loss of consciousness. He did not remember getting up after the play and said he felt drunk when he returned to the huddle. He remained in the game for one more play and then came to the sideline under his own power.

The athlete demonstrated confusion and retrograde amnesia, and complained of tinnitus, nausea, and dizziness (American Academy of Orthopaedic Surgeons, 1991; Kelly, 1991; O’Donoghue, 1984). He was taken to the locker room, where his symptoms worsened. He was then transported to the emergency room by ambulance. Within minutes a CT scan was performed; the results were negative. By now the athlete was coherent and asymptomatic except for a mild headache.

The player returned with the team that night and was examined the next day by the team physician. His only complaint was a minor headache. He was forbidden to undertake any physical activity until his headache subsided (O’Donoghue, 1984). Within 3 days his condition improved. He did not play in the next game, but he resumed all workouts and practices 10 days following the injury.

The athlete practiced and participated for the next 5 weeks, suffering head trauma in the first and second games of the season. In each incident he experienced a transient period of “dullness” and never felt “just right.” He did not report either episode or any of the symptoms to the team’s medical staff until later when he suffered his fifth and most severe concussion (described at the beginning).

Baseline Testing

During the 1993 season the player was on a different team wherein every player on the roster had a baseline neuropsychological evaluation (J.C. Maroon, M.R. Lovell, & J. Norwig, Dept. of Neurosurgery, Allegheny General Hosp., Pittsburgh, Oct. 1993). This evaluation tested attention/concentration, memory, problem solving, language, and fine motor coordination. The testing procedures involved the following:

- Orientation questionnaire
- Hopkins verbal learning
- Logical memory, visual reproduction, and digit span
- Subtests of the Wechler memory scale, revised:
  - Trail making test
  - Wisconsin card sorting test
  - Stroop test
  - Grooved pegboard test
  - Symbol digit modalities test
  - Controlled oral work association test.

Following this more severe concussion, the player returned to the physician who had administered the neuropsychological evaluations to his former team. He was completely retested by a neurosurgeon, who saw him 12 days following the last injury. The findings of the physicians (J.C. Maroon & M.R. Lovell, Dept. of Neurosurgery, Allegheny General Hosp., Pittsburgh, personal communication) were as follows:

- cranial nerve functions: normal
- motor, sensory, reflex: normal
- coordination (including gait station, rapid movements, and finger-to-nose testing: normal

Despite these physical findings, the player still complained of persistent headaches, mood swings, difficulty in judgment and memory, and blurred vision in his right eye. Detailed memory testing confirmed that his memory was 50% impaired compared to base-