

INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

June 2, 2006

SPORTS-RELATED SPINAL CORD INJURIES, OKLAHOMA, 1988-2003

INTRODUCTION

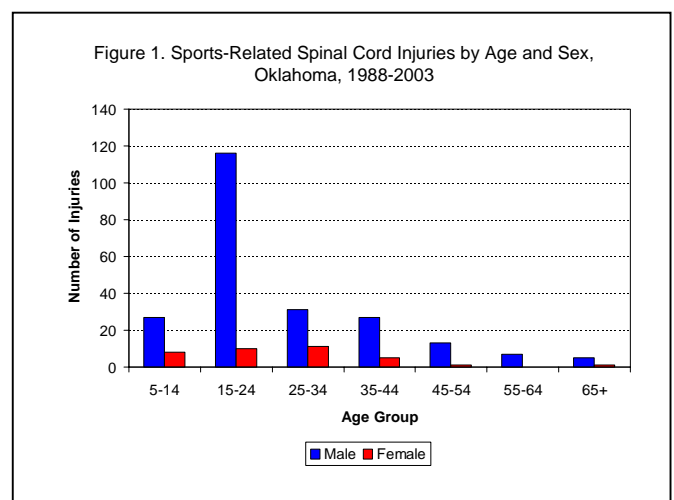
Various injuries ranging from abrasions or contusions to fractured bones come to mind when mentioning sports-related injuries. Contact sports may present an immediate cause for concern, although equal consideration should be given to pastimes in which collisions with inanimate objects are possible. Although most injuries are relatively minor, neurologic injuries can occur and may be very severe and result in long-term disabilities. The average lifetime direct charges attributable to sports-related spinal cord injuries have been estimated at a million dollars per person.

This report describes the occurrence of spinal cord injury resulting from sport activities. Patients who were hospitalized were included in the analysis; however, those who died at the scene or in an emergency department and did not have definitive diagnosis were not included. Of the 2312 cases of traumatic spinal cord injury reported from 1988 to 2003 in Oklahoma, 262 (11%) were the result of sports-related incidents (annual incidence 0.5/100,000 population); 10 (4%) fatalities occurred. Although rates for spinal cord injury stemming from participation in sporting activities suggest that these injuries are somewhat rare events, analysis of the data and prevention recommendations are essential as the outcomes of such injuries can be devastating.

DESCRIPTIVE EPIDEMIOLOGY

Eighty-six percent (226/262) of sports-related spinal cord injury cases occurred among males (Figure 1). Overall, males were 6 times more likely to experience spinal cord trauma than females. Cases ranged in age from 7 to 82 years. Sports-related spinal cord injuries peaked among males ages 15 to 24 years while injuries to females were highest among persons 25 to 34 years. Whites had the highest rate of injury (0.6/100,000), followed by African Americans and Native Americans (0.3/100,000 each).

The number of days spent in a hospital ranged from one to 94 with an average stay of 13 days. Among the 252 survivors, 194 (77%) suffered a quadriplegic injury (42 complete, 152 incomplete), and 58 (23%) suffered a paraplegic injury (9 complete, 49 incomplete).



*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10th Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information are also available at www.health.state.ok.us/program/injury.

The discharge status was known for 222 survivors. Of these, 115 (52%) were discharged home and 97 (44%) were released to an inpatient rehabilitation facility following their hospital stay. Length of the rehabilitation stay was documented for 74 persons; the average stay was 37 days and ranged from 1 day to 136 days. Of the 150 patients who were known not to have received treatment in an inpatient rehabilitation facility, the following reasons were given: complete recovery (84), not able to rehabilitate or not recommended (33), received outpatient therapy (8), patient refused rehabilitation (2), no money or insurance (1), and other/unknown reasons (22).

Among persons over 14 years of age, consumption of alcoholic beverages was reported as a contributing factor in 23% of the 227 incidents. Twenty-three percent of males and 18% of females were using alcohol. White males represented 75% of the 51 spinal cord injuries involving alcohol. Seventy-five percent of persons who were using alcohol were diving.

The most common activities contributing to sports-related spinal cord injuries were diving (34%), football (20%), horseback riding (12%), hunting (7%), wrestling (5%), and jumping on a trampoline (4%) (Figure 2). Other sports activities which were infrequently related to spinal cord injuries included rodeo, sledding, water/snow skiing, rappelling, soccer, swimming, and boxing. Of the 10 deaths, 3 occurred among persons diving, 2 horseback riding, 2 hunting, 1 bull riding, 1 snow skiing, and 1 wrestling. Over two-thirds (69%) of sports-related spinal cord injuries occurred between June and October (Figure 3) and more than one-third (37%) occurred on Saturday or Sunday (Figure 4).

Diving-Related Spinal Cord Injuries

Diving-related spinal cord injuries were the leading cause of sports-related spinal cord injury for both males and females over the sixteen-year time period accounting for 34% (88/262) sports-related cases. Fatalities resulted from three diving-related incidents. Males represented 86% (76/88) of diving-related spinal cord injuries; 53% of injuries were among males 15 to 24 years of age. Alcohol was involved in 51% of cases among males and 25% among females. Eighty-two of the 85 survivors of diving-related incidents suffered quadriplegia (Table 1); 43% (35/82) experienced complete quadriplegia, and incomplete quadriplegia was diagnosed in 57% (47/82) cases. Overall, 66% of survivors were discharged to an inpatient rehabilitation facility.

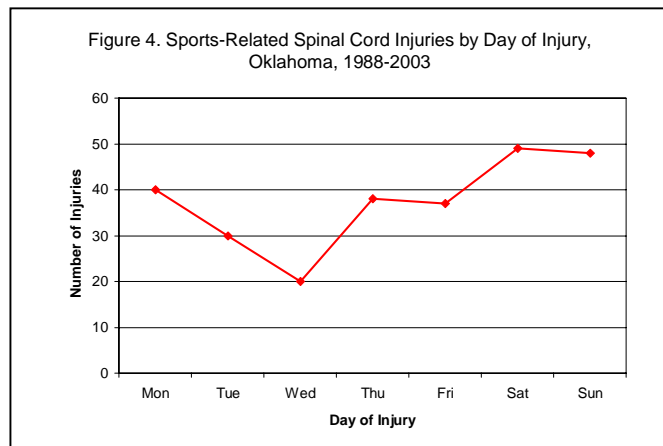
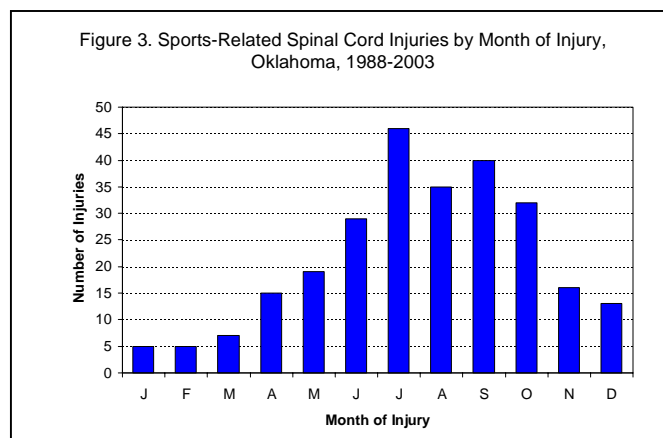
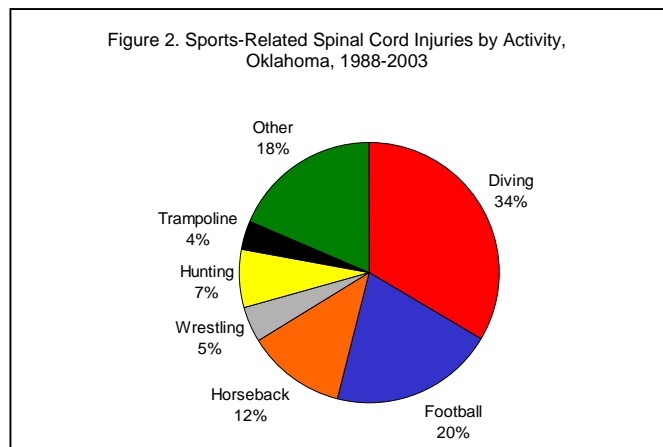


Table 1. Diving-Related Spinal Cord Injuries among Survivors by Type and Degree, Oklahoma, 1988-2003

Type of Injury	Complete	Incomplete	Total
Paraplegia	0	3	3 (4%)
Quadriplegia	35	47	82 (96%)
Total	35 (41%)	50 (59%)	85 (100%)

Football-Related Spinal Cord Injuries

Spinal cord injuries resulting from playing football accounted for 20% (53) of the 262 sport-related injuries. All of the injured persons were males and 68% (36/53) of the cases were 15-24 years of age. There was no alcohol consumption reported among these cases. The types of injuries among this group were incomplete quadriplegia (44) and incomplete paraplegia (9). Among the survivors of football-related spinal cord injuries, 79% had a complete recovery and 4% were discharged to an inpatient rehabilitation facility.

Horseback Riding-Related Spinal Cord Injuries

Horseback riding-related spinal cord injuries were the third leading cause of sports-related spinal cord injuries in Oklahoma during 1988-2003. Injuries resulting from riding horses accounted for two deaths (both males) and 31 non-fatal spinal cord injuries. Females represented 33% (11/33) of the horseback riders. Alcohol was involved in 12% (3 males and one female) of the cases. Of the 31 survivors, one suffered complete paraplegia, 15 incomplete paraplegia, and 15 incomplete quadriplegia. Overall, 33% percent had a complete recovery and nearly one-third (32%) were discharged to a rehabilitation facility.

CASE BRIEFS

- A 15-year old black male dove off a cliff headfirst into a river. He went limp in the water. His cousin pulled him out, threw him in the back of a pickup truck, and took him to a nearby hospital. He was then transferred to another hospital where he died 10 days later.
- A 31-year old white female was on a deer stand approximately 15 feet above the ground. She fell asleep and fell from the deer stand. She stayed on the ground for two hours before a friend found her. She spent 11 days at a regional hospital with complete paraplegia and was later discharged to a rehabilitation facility.
- A 51-year old white male was water skiing and hit a large wave in the water, which caused him to lose control. His neck was jarred backward and then forward. He landed on his face in the water. He immediately lost sensation and motor function in his upper and lower extremities. He was able to turn his head in order to breathe and his life jacket kept him afloat. His family, who was in the boat, immediately called emergency medical services, who removed him from the water. He spent two days at a nearby hospital where he slowly regained sensation and movement.
- A 16-year old white female was cheerleading. She was standing on another cheerleader's hands and fell backward approximately six feet landing on her neck. She had numbness of both upper extremities immediately. She was admitted to a nearby hospital and suffered incomplete quadriplegia. She was released home 7 days later.
- A 29-year old white male had been drinking and was jumping on a trampoline. He fell on his head and injured his neck. He complained of a burning sensation in his arms and legs. Upon examination, he had decreased sensation and some weakness. He suffered transient quadriplegia, but recovered completely.
- A 16-year old white male was struck from behind while playing football and landed on his head twisting his neck. Another player grabbed his helmet and jerked his head. He suffered incomplete quadriplegia and spent four days in a hospital.
- A 32-year old white male was horseback riding when the horse bucked and threw him off onto his head and back. He lost sensation immediately. He later regained sensation, but he could not sit up. His friend called an ambulance, which transported him to a nearby hospital where he spent 7 days.

RECOMMENDED PREVENTIVE MEASURES

Persons participating in sports-related activities should be educated on the causes and contributing factors of serious injuries. The following recommendations may result in a decline in the number of injuries.

- Always check water depth before diving into a swimming pool or any other body of water.
- Wear protective equipment as recommended for each sport.
- Do not consume alcoholic beverages prior to or during participation in sporting activities.

Prepared by: Sylvera Demas, MPH
Public Health Prevention Specialist
Injury Prevention Service