

THE INCIDENCE OF HEAD AND NECK INJURIES IN EXTREME SPORTS



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What is a Concussion

- ◆ a complex pathophysiological process that affects the brain, typically induced by trauma
- ◆ Caused either by a direct blow to the head or an indirect blow to the body → neurological impairments that may resolve spontaneously
- ◆ Symptoms usually reflect a functional disturbance to the brain, and may include symptoms:
 - physical (e.g., headaches, nausea)
 - cognitive (e.g., difficulty with concentration or memory)
 - emotional (e.g., irritability, sadness)
 - maintenance' (e.g., sleep disturbances, changes in appetite or energy levels)
- ◆ A concussion is considered a brain injury.

Concussions

- ◆ Each year, U.S. emergency departments (EDs) treat an estimated 173,285 **sports- and recreation-related** traumatic brain injuries, including concussions
- ◆ Children from birth to 19 years of age
- ◆ Children and teens are more likely to get a concussion and take longer to recover than adults.

Estimated TBI vs. non-fatal injuries

Activity	TBIs	All visits for sports and recreation--related injuries	% of all visits for injuries that were TBIs
	No.*	No.*	
Bicycling	26,212	323,571	8.1
Skateboarding	6,004	101,577	5.9
Moped/Dirt bike riding	3,370	39,363	8.6
Roller skating/ Unspecified skating	1,126	34,717	3.2
In-line skating	853	25,350	3.4
Total	173,285	2,651,581	6.5

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6039a1.htm?s_cid=mm6039a1_w#tab1

Extreme Sports

- What are extreme sports?
 - non-traditional, adventure sports
 - high-risk activities with the potential for serious injury and danger, including the risk of a fatal injury.
- evolved to denote activities such as bungee jumping, snowboarding, extreme skiing, canyoning, surfing, skateboarding, sky-diving, paragliding, rock climbing and mountain bicycling



Extreme Sports



- Since the mid 1960s, international participation has grown exponentially, especially among teenagers
- Accepted as a separate and organized entity as evidenced by
 - the advent and rising popularity of the X-games
 - Winter Olympics in 2014



Extreme Sports

- Despite heightened participation
- little evidence exists describing injury rates due to:
 - non-traditional
 - independent participation
 - lack of official regulation
- Increased risk of injury and death → necessitates the need to better understand injury rates and trends
- Specifically, head and neck injuries (HNI) are a growing concern because of increased awareness of short and long term consequences reported in the literature



Media and Concussions

- ◆ First White House Healthy Kids & Safe Sports Concussion Summit – **May 29, 2014** - **President Obama said:**
- ◆ We need 'better data' on sports concussions
- ◆ “We've got to have better research, better data, better safety equipment, better protocols.”

PURPOSE

Describe the epidemiology of head and neck injuries in participants of seven extreme sports from 2000 to 2011.



METHODS

- The Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System (NEISS) was used
- HNIs associated with 7 extreme sports were examined using the NEISS consumer product codes
- Sport Participation figures were obtained using The Outdoor Foundation annual participation report
- Incidence rates and incidence rate ratios were calculated from 2007 to 2012 (excluding motocross which lacked available data)

The screenshot shows the 'U.S. Consumer Product Safety Commission NEISS Estimates Query Builder' interface. It includes fields for 'Treatment Dates' (From: 01/01/2012, To: 12/31/2012), 'NEISS Product Codes' (From and To fields), and 'Other Parameters' (Sex, Age From, Age To, Body Part, Diagnosis, Disposition, Location). There are also 'Submit Query' and 'Reset' buttons at the bottom.

METHODS

TYPES OF SPORTS

Skateboarding
Mountain Biking
Motocross
Surfing
Snowboarding
Snow skiing
Snowmobiling

HEAD INJURIES

Concussion
Contusions/Abrasions
Fractures
Lacerations

NECK INJURIES

Strain/sprains
Contusions/Abrasions
Fractures
Lacerations

RESULTS

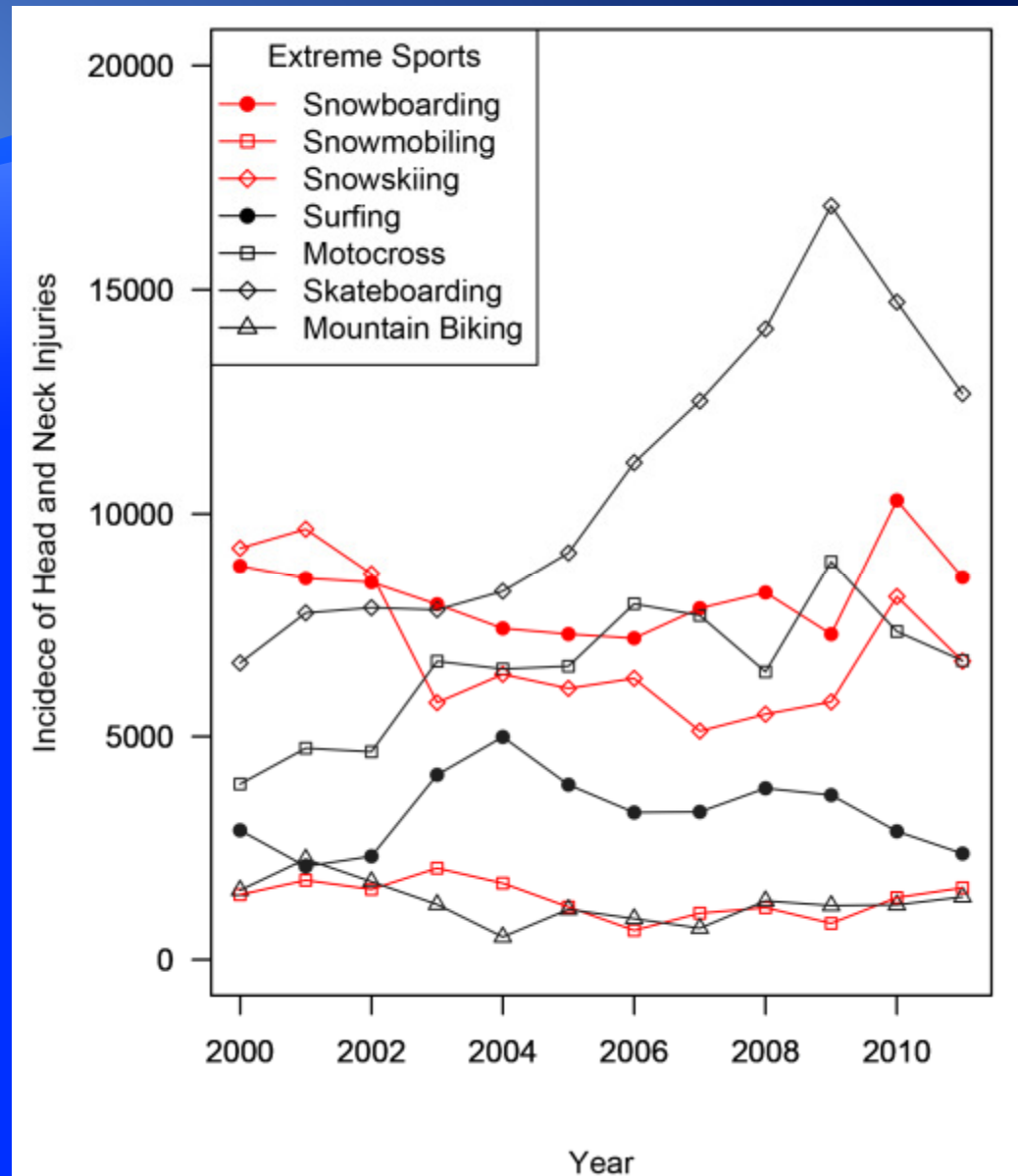
- 4,083,691 total injuries reported for all seven extreme sports
- 460,115 (11.3%) were head and neck injuries
 - 381,760 (83%) were head injuries
 - 78,355 (17%) were neck injuries
- The risk of an extreme sport participant suffering a HNI over a one-year period was 5.16 per 10,000 person-years



RESULTS

The four sports with the highest total number of reported HNI injuries were:

1. skateboarding (129,600)
2. snowboarding (97,527)
3. skiing (83,313)
4. motocross (78,236)



RESULTS

- ◆ 140,650 concussions (31% of HNI, 3.4% of all injuries)

Sport	Incidence rate*	Incidence Rate Ratio
Mountain Biking	50	1.00
Snowmobiling	60	1.20
Surfing	103	2.06
Snow Skiing	152	3.04
Skateboarding	415	8.30
Snowboarding	534	10.68

RESULTS

Skull Fractures

Sport	Incidence Rate (1,000,000 person-years)
Snowboarding	1
Mountain Biking	2
Snow Skiing	2
Snowmobiling	4
Surfing	9
Skateboarding	55

Neck Fractures

Sport	Incidence Rate (1,000,000 person-years)
Skateboarding	1
Snow Skiing	5
Snowmobiling	6
Snowboarding	7
Mountain Biking	13
Surfing	38

Conclusions

- This study establishes incidence rates of HNI in extreme sports
 - ◆ Over 12 yrs, 4million injuries occurred, 11.3% (460,115) were HNI
- Concussions were the most common HNI among extreme sports participants
 - ◆ Highest risk in snowboarding and skateboarding participation

Conclusions

- ◆ Risk for TBI is inherent to physical activity and can occur during any activity at any age.
- ◆ Minimize risk by:
 - ◆ 1) using protective equipment that is appropriate for the activity, fits correctly, is well maintained
 - ◆ 2) coaching appropriate sport-specific skills with an emphasis on safe practices and proper technique;
 - ◆ 3) adhering to rules of play with good sportsmanship and strict officiating

Conclusions

- ◆ Secondary prevention strategies include increasing awareness of the signs and symptoms of TBI and recognizing and responding quickly and appropriately to suspected TBI.

Conclusions

- ◆ Participants suspected of having a TBI should:
 - ◆ be removed from play
 - ◆ never returned to play the same day
 - ◆ allowed to return only after evaluation and clearance by a health-care provider who is experienced in diagnosing and managing TBI

Conclusions

- ◆ **Return to play is a critical decision because children and adolescents are at increased risk for:**
 - ◆ repeat concussion during sports and recreation activities
 - ◆ long-term sequelae
 - ◆ delayed recovery
 - ◆ cumulative consequences of multiple TBIs (e.g., increased severity of future TBIs and increased risk for depression and dementia)

ABC News



- ◆ Extreme sport competitions such as the X Games and Core Tour were born out of athletes who live and breathe doing flips on snowmobiles, landing 1,080-degree turns on skis and BASE-jumping off 2,000-foot cliffs.
- ◆ But even the best daredevils have suffered unimaginable injuries, some fatal, doing what they love
 - Caleb Moore- Snowmobiler
 - Jeb Corliss- Base Jumper
 - Sarah Burke- Freestyle Skier
 - Kevin Pearce- Snowboarder
 - Mat "the condor" Hoffman- BMX Rider
 - Stephan Murray- BMX Dirt Rider
 - John Kucera- Downhill Ski Champion
 - Bethany Hamilton- Surf Champ
 - Jeremy Lusk- Freestyle Moto X Star



PERSONAL HEALTH

With the Thrills Come Extreme Risks

By JANE E. BRODY MARCH 31, 2014 12:10 PM 59 Comments



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Despite several well-publicized accidents, like the [death last year of the snowmobiler Caleb Moore](#), just 25, the popularity of extreme sports has soared in recent years. Participants in the X Games and other sporting events regularly perform heart-stopping tricks on

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Conclusion

- ◆ The recent death of extreme snowmobiler Caleb Moore at the 2013 Winter X games demonstrated the serious risks associated with these sports.
- ◆ HNI can greatly alter a person's quality of life, and as participation in these sports increases, a well-established understanding of the incidence of HNI will assist in implementing effective medical prevention programs and proper safety equipment practices.

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