

# Young Athlete Conference: Skating on Thin Ice: Common Injuries in Hockey

Brian Harvey, DO

Children's Mercy Sports Medicine Center

Assistant Professor, UMKC



The official health care provider  
of Sporting Kansas City



# Objectives

- Review the epidemiology of injuries in hockey
- Understand the on-ice management of common and severe injuries
- Review common injury and management of hockey injuries
- Review concussions in hockey and steps made to make the game safer



# Disclosures

- I have no financial disclosures pertinent to this topic
  - I have never played hockey...my skills are pretty much summed up here



# Just who exactly is playing hockey?!

- 1.5 million world wide participants
- 562,145 males registered in the US
  - 4200 NCAA participants
  - 154,256 U10 boys
  - 36,000 high school boys
- 200,000 world wide females
  - 33,236 U10 girls
  - 9,500 high school girls
  - 2355 NCAA
  - 7 fold increase in women's participation

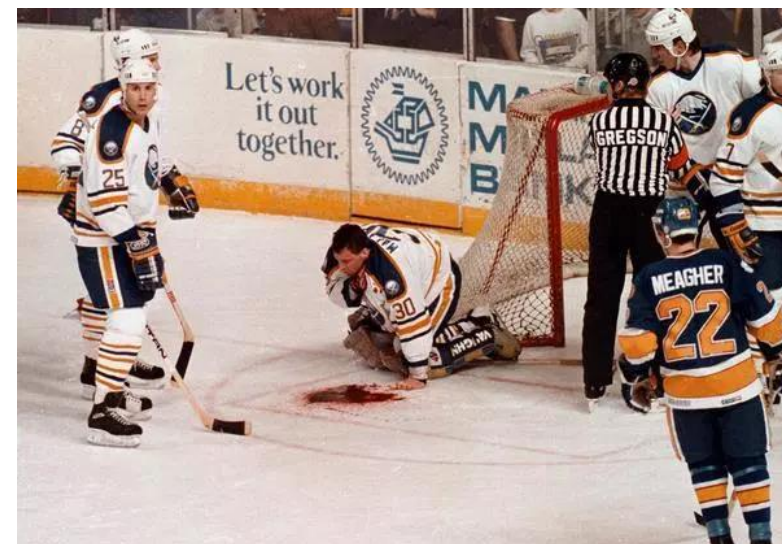


# Injury Rates for Hockey

- Overall Boy's
  - 2.56/1000 AE's
- Overall Men's
  - 4.72/1000 AE's
- Overall Women's
  - 3.24/1000 AE's
- Boy's Game time
  - 5.65/1000 AE's
- Men's Game time
  - 13.45/1000 AE's
- Women's Game time
  - 7.04/1000 AE's

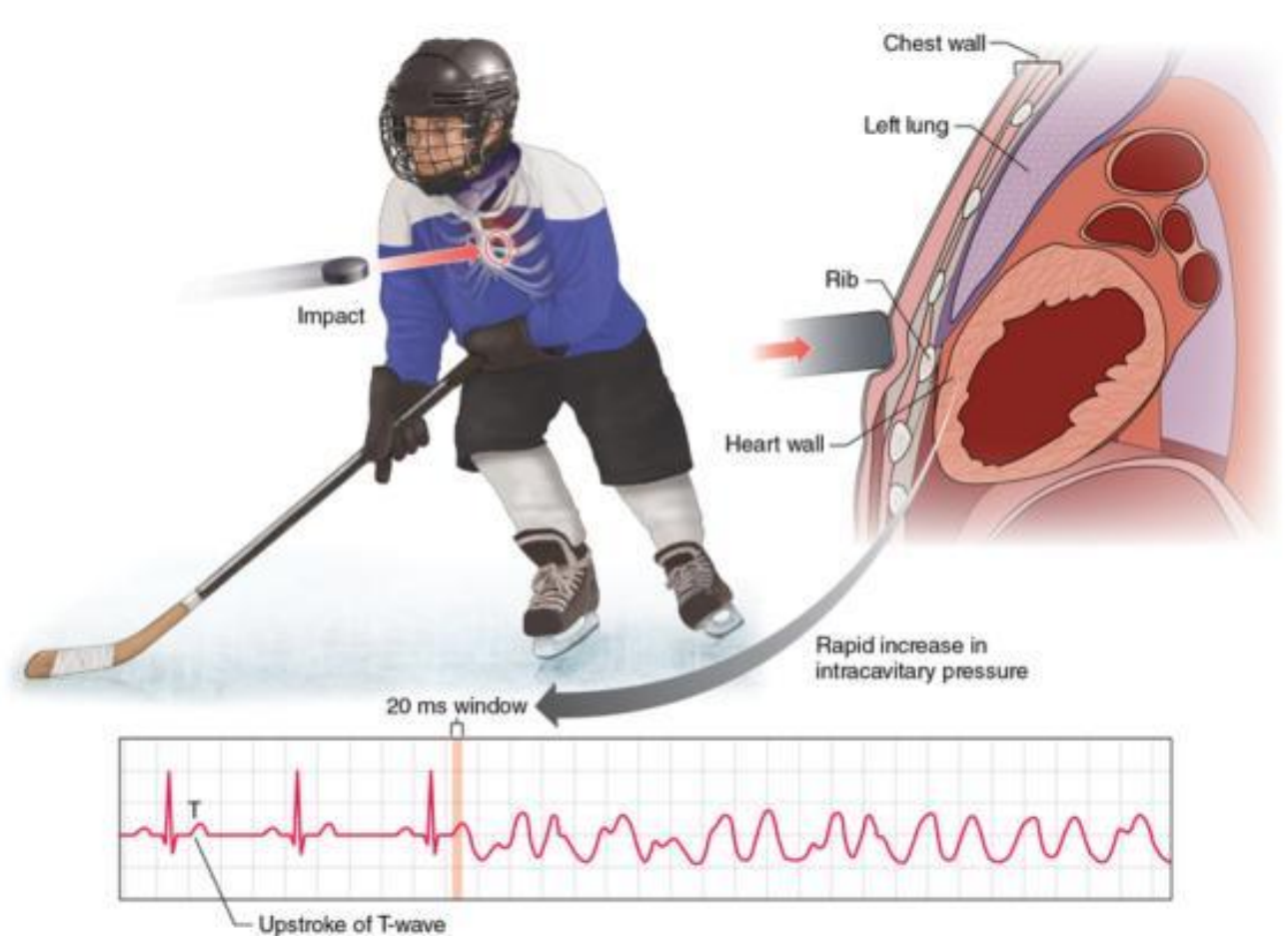


# 20 year old male down on the ice!



# The Severe and Catastrophic – Face, Neck, and chest

- Lacerations
- Fractures
- Eye Injuries
- Dental
- Neck/C-spine injuries
- Commotio cordis



# 22 year old stick to the face

- Headache
- Blurry vision
- Dizziness





# Definition of Concussion.....ish

- May be due to direct blow to face, head, neck, or elsewhere on body
- Rapid onset of symptoms after injury that resolve on their own
- Acute symptoms usually due to functional disturbance rather than structural injury
- Results in graded set of clinical symptoms that may or may not involve LOC
- Clinical signs/symptoms cannot be explained by drug, alcohol, medication or other injuries
- Observed/documentated disorientation or confusion immediately after
- Impaired balance within 1 day
- Slower reaction time within 2 days
- Impaired verbal learning/memory within 2 days



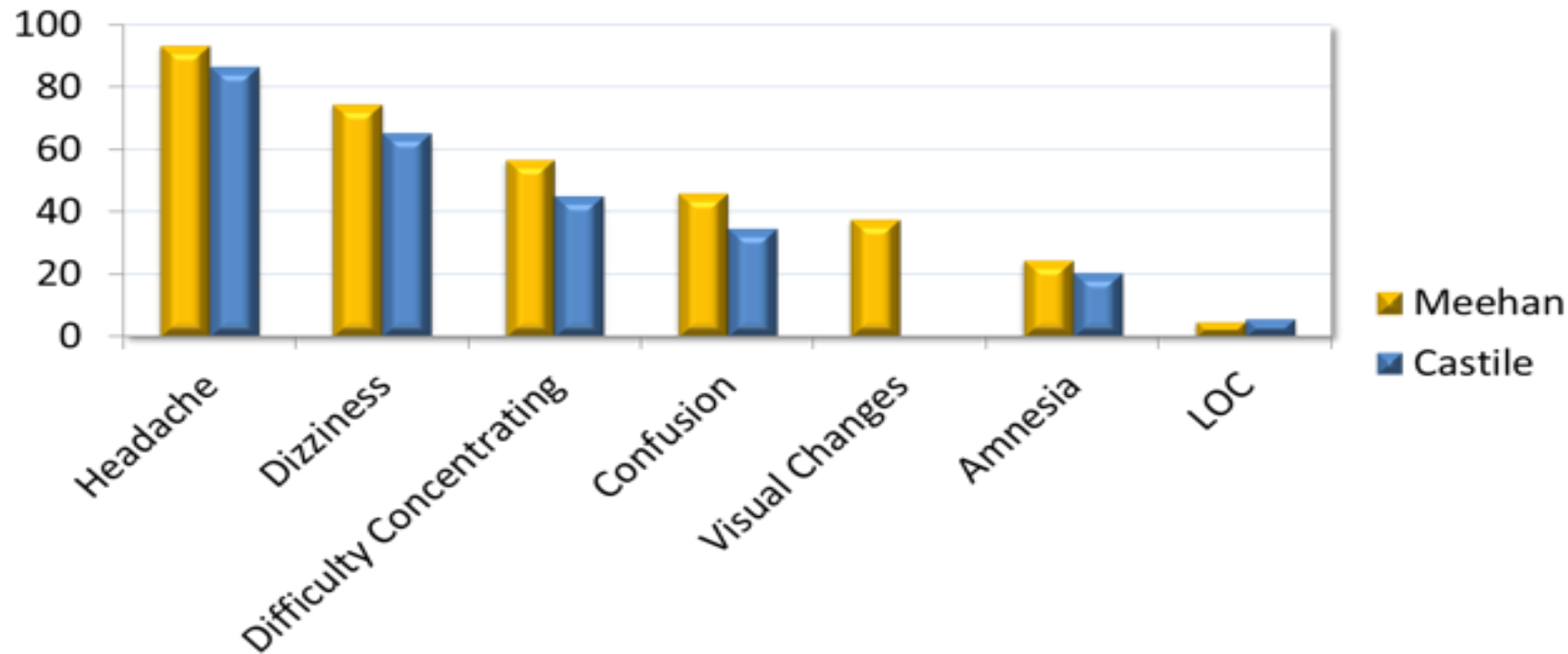
# Concussion symptoms

- Any ONE or ALL of these symptoms is a concussion
- Any of these symptoms may **WORSEN** with mental or physical activity

	none	mild		moderate		severe		
Headache	0	1	2	3	4	5	6	
"Pressure in head"	0	1	2	3	4	5	6	
Neck Pain	0	1	2	3	4	5	6	
Nausea or vomiting	0	1	2	3	4	5	6	
Dizziness	0	1	2	3	4	5	6	
Blurred vision	0	1	2	3	4	5	6	
Balance problems	0	1	2	3	4	5	6	
Sensitivity to light	0	1	2	3	4	5	6	
Sensitivity to noise	0	1	2	3	4	5	6	
Feeling slowed down	0	1	2	3	4	5	6	
Feeling like "in a fog"	0	1	2	3	4	5	6	
"Don't feel right"	0	1	2	3	4	5	6	
Difficulty concentrating	0	1	2	3	4	5	6	
Difficulty remembering	0	1	2	3	4	5	6	
Fatigue or low energy	0	1	2	3	4	5	6	
Confusion	0	1	2	3	4	5	6	
Drowsiness	0	1	2	3	4	5	6	
More emotional	0	1	2	3	4	5	6	
Irritability	0	1	2	3	4	5	6	
Sadness	0	1	2	3	4	5	6	
Nervous or Anxious	0	1	2	3	4	5	6	
Trouble falling asleep (if applicable)	0	1	2	3	4	5	6	
Total number of symptoms:							of 22	
Symptom severity score:							of 132	
Do your symptoms get worse with physical activity?							Y	N
Do your symptoms get worse with mental activity?							Y	N
If 100% is feeling perfectly normal, what percent of normal do you feel?								
If not 100%, why?								

# Concussion symptoms

- Most common Symptoms



# When in doubt, sit them out!!

- Remove a player who shows signs of a SRC
  - No return to play the same day
  - Repeat evaluations
  - Don't leave them alone
- Certified Athletic Trainers are VITAL on the sideline



# Consensus Statements: AAP, AMSSM, CISG Berlin 2016

- Sideline evaluation in a distraction free area
  - SCAT 5 (12 and older)
  - Child SCAT 5 (less than 12)
- Remove a player who shows signs of an SRC
  - No return to play the same day
  - Repeat evaluations
  - Don't leave them alone
- Neuropsychology testing – helpful but not mandatory



## Consensus Statements: (cont)

- Brief cognitive and physical rest for 24-48 hours
  - Encourage sub-symptom activity, both cognitive and physical
- Imaging and Biologic testing - not ready for commercial use
- Rehabilitation
  - Data supports psychological, cervical and vestibular rehab although further research needed to determine exact amount, timing and duration
- 5 step return to play once asymptomatic



# 18 year old comes off with shoulder pain

- Tender over the AC joint
- Step off noted
- Decreased Range of motion



# Common Upper Extremity Injuries

- Upper Extremity - Accounts for 44% of youth ice hockey injuries
  - AC Joint Separation
  - GH joint dislocation
  - Clavicle Fracture
  - Metacarpal fractures





# 16 year old female, big hit to her knee

- Medial knee pain
- Pain with valgus, unable to assess ACL due to equipment
- Limping



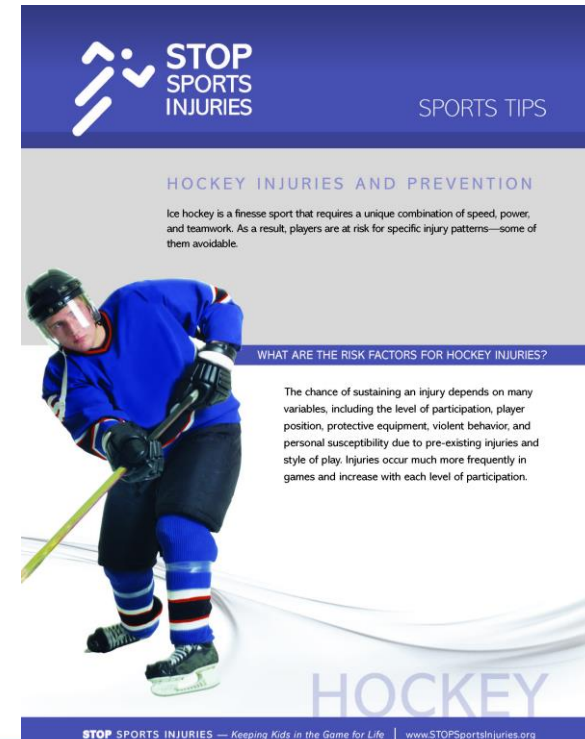
# Common Lower Extremity Injuries

- Lower Extremity – account for 30-45% of all hockey player related injury
- Groin and Thigh
  - Adductor strain, FAI, h
- Knee
  - MCL, ACL
- Ankle pain
  - skate bite, high ankle



# CDC Injury Prevention Tips

- Obtaining a preseason screening examination Participating in a sports-specific conditioning program to avoid physical overload.
- Obtaining high-quality equipment that fits well and is not damaged, worn-out, or undersized.
- Enforcement of existing rules. Research is following injury trends after rule changes.
- Following injury and treatment recommendations.



**STOP**  
SPORTS  
INJURIES

SPORTS TIPS

HOCKEY INJURIES AND PREVENTION

Ice hockey is a finesse sport that requires a unique combination of speed, power, and teamwork. As a result, players are at risk for specific injury patterns—some of them avoidable.

WHAT ARE THE RISK FACTORS FOR HOCKEY INJURIES?

The chance of sustaining an injury depends on many variables, including the level of participation, player position, protective equipment, violent behavior, and personal susceptibility due to pre-existing injuries and style of play. Injuries occur much more frequently in games and increase with each level of participation.

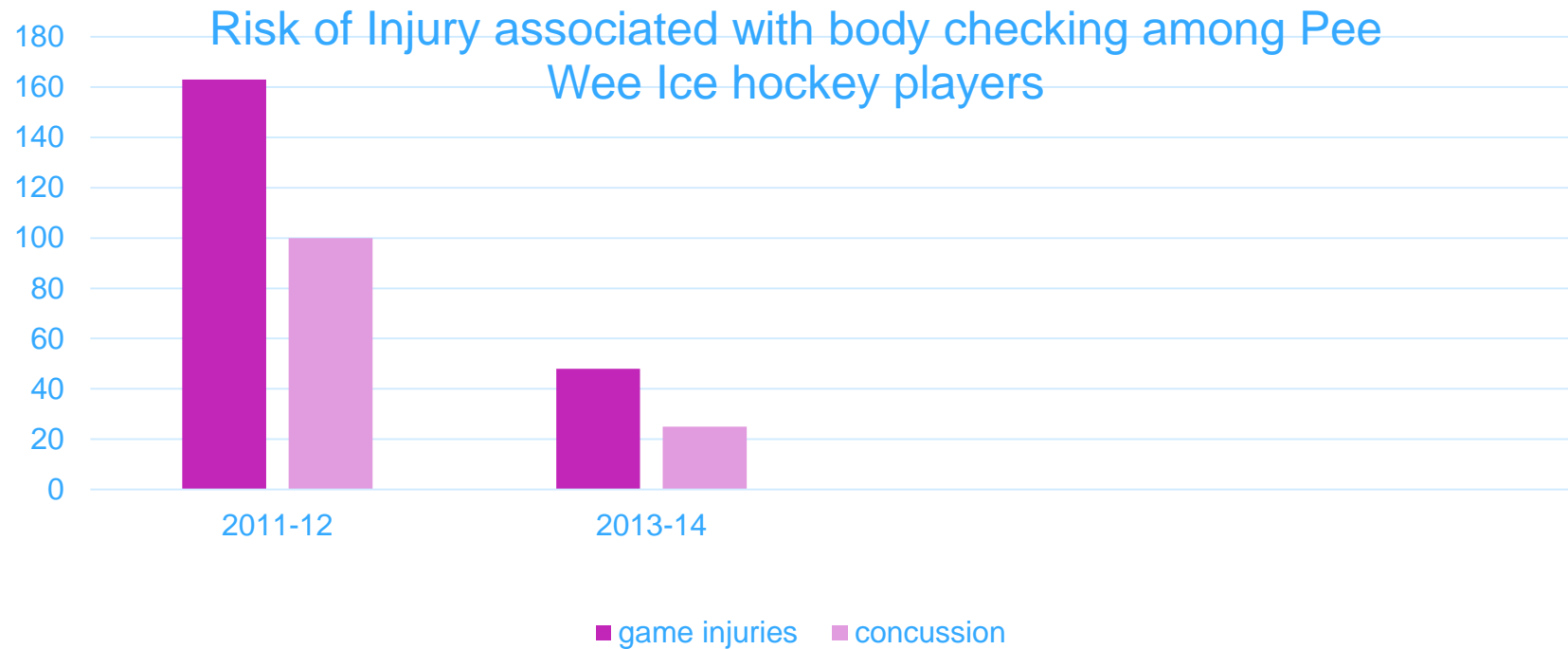
**HOCKEY**

**STOP** SPORTS INJURIES — Keeping Kids in the Game for Life | [www.STOPSportsInjuries.org](http://www.STOPSportsInjuries.org)

# Checking Rule Change

*Black et al. Br J of Sports Med. 2017 Dec; 51(24) 1767-1772.*

- 2013, Hockey Canada delayed checking until Bantam nationwide (13-14 years of age)



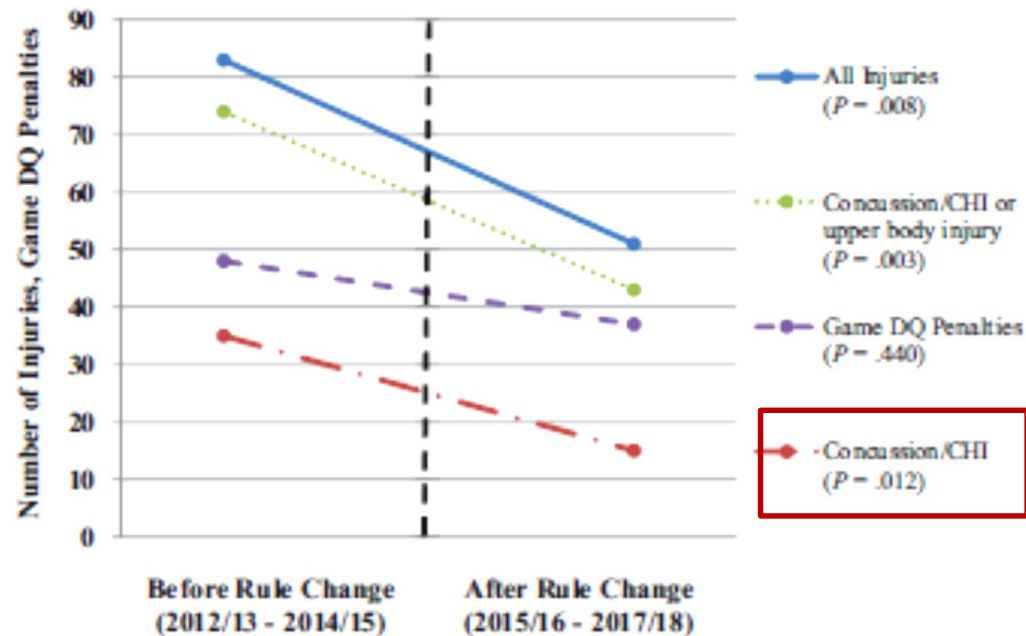
# PIM Rule Change

*Kriz et al. The American Journal of Sports Medicine, 47(2), 438–443.*

- **Penalty infraction minute rule change**
  - Any player who has accumulated:
    - 50 penalty minutes suspended for 2 league games and any games between.
    - 70 penalty minutes suspended for the remainder of the hockey season, (including playoffs).
    - If it is the last game, he will sit out the first 2 league games in the next year or, if a senior, 2 league games in the next sport season.

# PIM Rule Changes Effective?

Kriz et al. *The American Journal of Sports Medicine*, 47(2), 438–443.



- Important to note:
  - Concussion Dx in ED decreased
  - Is this a result of increased knowledge of sport-related concussion or fewer concussions?

TABLE 3  
Game-Related Injuries Among High School Boys' Hockey Players<sup>a</sup>

Primary Injury	Before Rule Change			After Rule Change		
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
ED visits	31	27	25	15	9	27
Concussion/CHI	12	15	8	6	0	9
Upper body (excluding concussion)	16	9	14	5	8	15

# Questions?



# References

- Kriz PK. Et al. Effect of Penalty Minute Rule Change on Injuries and Game Disqualification Penalties in High School Ice Hockey. *Am J Sports Med.* 2019 Feb; 47(2):438-443
- Black AM, Hagel BE, Palacios-Derflingher L, et al. The risk of injury associated with body checking among Pee Wee ice hockey players: an evaluation of Hockey Canada's national body checking policy change. *Br J Sports Med* 2017;**51**:1767-1772.
- Krolkowski, M. P., Black, A. M., Palacios-Derflingher, L., Blake, T. A., Schneider, K. J., & Emery, C. A. (2017). The Effect of the "Zero Tolerance for Head Contact" Rule Change on the Risk of Concussions in Youth Ice Hockey Players. *The American Journal of Sports Medicine*, 45(2), 468–473.
- Lynall RC et al. The First Decade of Web-Based Sports Injury Surveillance: Descriptive Epidemiology of Injuries in US High School Boys' Ice Hockey (2008-2009 Through 2013-2014) and National Collegiate Athletic Association Men's and Women's Ice Hockey (2004-2005 Through 2013-2014). *J Athl Train.* 2018 Dec;53(12):1129-1142. doi: 10.4085/1062-6050-176-17.
- Adams R, Li AY, Dai JB, et al. Modifying Factors for Concussion Incidence and Severity in the 2013-2017 National Hockey League Seasons. *Cureus.* 2018;**10**(10):e3530. Published 2018 Oct 31. doi:10.7759/cureus.3530
- Mosenthal et al. Common Ice Hockey Injuries and Treatment. *Current Sports Medicine Reports*: [September/October 2017 - Volume 16 - Issue 5 - p 357–362](#)
- LaPrade RF, Surowiec RK, Sochanska AN, et al. Epidemiology, identification, treatment and return to play of musculoskeletal-based ice hockey injuries. *Br J Sports Med* 2014;**48**:4-10.
- Moslener, Matthew, Wadsworth, Tyler. Ice Hockey: A Team Physician's Perspective. *Current Sports Medicine Reports*: [May-June 2010 - Volume 9 - Issue 3 - p 134-138](#)



# References

- Simmons MM, Swedler DI, Kerr ZY. Injury Surveillance of Head, Neck, and Facial Injuries in Collegiate Ice Hockey Players, 2009-2010 Through 2013-2014 Academic Years. *J Athl Train.* 2017;52(8):776-784.
- Popkin et al. Head, Neck and Shoulder Injuries in Ice Hockey: Current Concepts. *Am J Orthop.* 2017 May/Jun; 46(3): 123-124
- Stephanie F. Polites et al. Youth Ice Hockey Injuries Over 16 Years at a Pediatric Trauma Center. *Pediatrics* Jun 2014, 133 (6) e1601-e1607
- Lahti H, Sane J, Ylipaavalniemi P. Dental Injuries in Ice Hockey Games and Training. *Med Sci Sports Exerc.* 2002 Mar; 34(3): 400-2
- MacCormick L, Best TM, Flanigan DC. Are There Differences in Ice Hockey Injuries Between Sexes?: A Systematic Review. *Orthop J Sports Med.* 2014;2(1):2325967113518181.
- James N. Irvine, Jr, MD T. Sean Lynch, MD Bryan T. Hanypsiak, MD Charles A. Popkin, MD . Lower Extremity Injuries in Ice Hockey: Current Concepts. *Am J Orthop.* November 27, 2018
- Cohn et al. Rink-side management of ice hockey related injuries to the face, neck and chest. *Bull Hosp Jt Dis* 2013;71(4)253-6
- Popkin CA, Schulz BM, Park CN, Bottiglieri TS, Lynch TS. Evaluation, management and prevention of lower extremity youth ice hockey injuries. *Open Access J Sports Med.* 2016;7:167-176. Published 2016 Nov 21.
- Wolfinger CR, Davenport TE. PHYSICAL THERAPY MANAGEMENT OF ICE HOCKEY ATHLETES: FROM THE RINK TO THE CLINIC AND BACK. *Int J Sports Phys Ther.* 2016;11(3):482-95.
- Schneider et al. Concussion Burden, Recovery, and Risk Factors In Elite Youth Ice Hockey Players. *Clin J Sports Med.* 2018 Oct 8.
- Hollander K, Wellmann K, Eulenburg CZ, et al
- Epidemiology of injuries in outdoor and indoor hockey players over one season: a prospective cohort study. *Br J Sports Med* 2018;52:1091-1096.
- Trofa DP, Park CN, Noticewala MS, Lynch TS, Ahmad CS, Popkin CA. The Impact of Body Checking on Youth Ice Hockey Injuries. *Orthop J Sports Med.* 2017;5(12):2325967117741647. Published 2017 Dec 5

