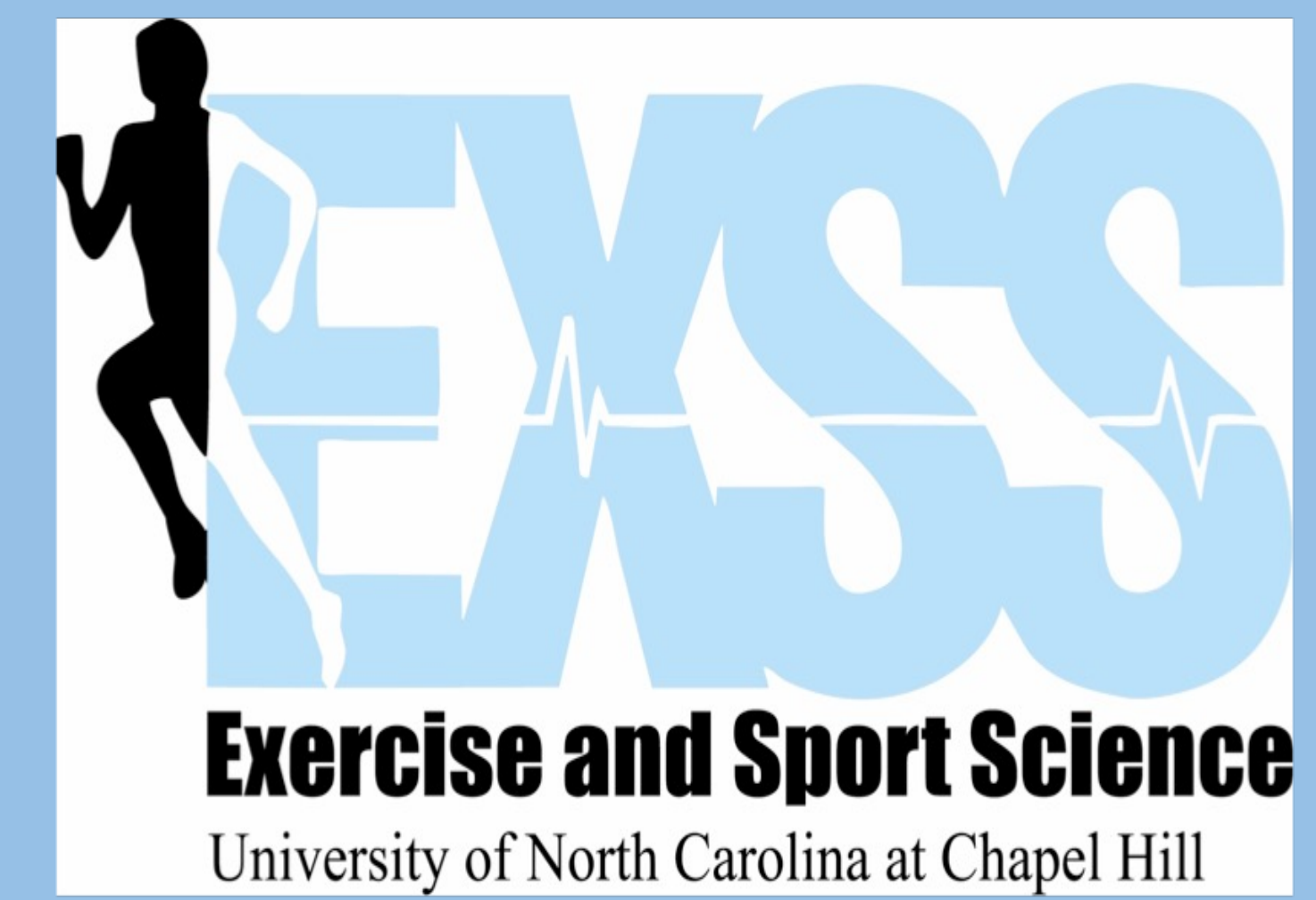


An Analysis of Ice Hockey Neck Lacerations: Using Haddon's Matrix to Develop Preventative Measures

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INTRODUCTION

- The International Ice Hockey Federation (IIHF) is one of two councils that have made neck guards mandatory for the senior categories in addition to the U20 and U18 categories, including the Olympics and men's and women's world championships¹.
- This mandate does not include the NHL.
- Additionally, USA Hockey approved legislation for mandatory neck protection to go into effect later this year².



PURPOSE

- To identify prevention strategies at the individual, community, and social levels to reduce the risk and improve outcomes from neck lacerations in ice hockey.

METHODOLOGY

- This research analyzes ice hockey neck laceration case summaries collected by the National Center for Catastrophic Sport Injury Research (NCCSIR) from newspaper articles and an online catastrophic injury report from 1985 to 2023.
- The following factors were identified: location, agent, injury resulted from a "check" or a fall, mechanism of injury, care provided, whether neck protection was worn, and survival.
- A Haddon Matrix was developed identify injury prevention strategies from the host, agent, physical environment, and social environment levels during pre-event, event, and post-event phases.

CONCLUSION

- This study highlights the Haddon Matrix as a valuable tool for preventing neck lacerations in ice hockey.
- Implementing educational programs, enforcing equipment standards, and mandating neck guards can reduce the risk of injury before a game starts.
- Proper player reactions and rink design can minimize injuries during the game.
- Finally, establishing post-injury protocols ensures timely response and medical care.

REFERENCES

¹ to injInternational Ice Hockey Federation. (2023, December 4). IIHF mandates neck laceration protection at all levels of IIHF competitions. IIHF. Retrieved April 16, 2024, from https://www.iihf.com/en/news/56022/iihf_mandates_neck_laceration_protection_at_all_levels
² USA Hockey. (2024, January 28). USA Hockey Congress Approves Requirement For Neck Laceration Protection Starting August 1. USA Hockey. Retrieved April 16, 2024, from https://www.usahockey.com/news_article/show/1296379
³ Williams, Allan F. (1999) The Haddon matrix: its contribution to injury prevention and control. 1999-05-09 - 1999-05-12.

RESULTS

- **15 ice hockey injuries** were reviewed from 1985 to 2023.
- **Age of Players:**
 - 1 youth level case
 - 11 junior/high school level cases
 - 3 collegiate/professional level cases

- **Cause of Injuries:**
 - Ice hockey skate (11 cases)
 - 9 neck and 2 wrist lacerations
 - Ice hockey stick (1 case), ice hockey puck (1 case)

- **Neck Protection and Outcome:**
 - 8 cases were not wearing neck protection
 - 7 cases neck protection not specified
- **Outcome:** 10 survived, 5 died

Figure 1. Haddon Matrix	Athlete (ice hockey player)	Agent (ice hockey skate, puck, or stick)	Environment (ice hockey rink)	Social (community norms, policies, rules)
Pre-event (before the neck laceration)	Educate ice hockey players on the importance of wearing neck protection to reduce neck injuries, getting up immediately after falling on the ice to prevent contact with another player's skates, and avoiding other players if they fall. Have athletes participate in basic emergency training in case medical personnel is not available.	Require coverings to be put on skates anytime they are not in use and ensure skates, pucks, and sticks are all up to safety standards.	Increase number of health care personnel to ensure efficient medical care in the event of an accident or injury. Implement "stop the bleed" emergency kits to have on hand at the time of the event. Evaluate the ice before and after each practice, scrimmage, and game.	Encourage parental involvement in reinforcing the importance of safety during games, practices, or scrimmages. Adopt policy that requires neck protection to be worn during ice hockey games to avoid neck lacerations from different agents.
Event (during the laceration and time of impact)	Teach players to react immediately after an injury, call for help, and apply direct pressure to area.	Provide immediate access to backup equipment in case of damage or malfunction during the event, ensuring that players can quickly replace any faulty gear to minimize further injury.	Install additional safety features, such as padding or barriers, around the perimeter of the ice rink to minimize the impact of collisions or falls .	
Post-event (after the athlete is injured from the laceration)	Establish clear procedures for handling post-event medical evaluations and follow-up care to ensure injured athletes receive appropriate treatment.	Develop protocols for post-injury incident reviews to identify other contributing factors to injury or areas for improvement in safety procedures and equipment standards.	Secure a safe space for emergency personnel to quickly enter and exit during the time of injury. Put together emergency kits before playing time that are readily available for emergency personnel in the time of injury.	Provide financial support to employ athletic trainers or other medical personnel who can be on-site for practice and game.

An 18-year-old male ice hockey player suffered from a fatal neck laceration during a junior league game. The male forward's teammate had been hip-checked and fell to the ice, striking the forward's neck on the way down. It was determined that neither of the males was wearing neck protection during this accident. While first aid personnel were on the scene, the forward player was rushed to the hospital quickly after the accident. He did not survive his injuries.

Figure 2. Case summary used to determine the key factors of the injury.



Game, checked by teammate, athlete fell, neck cut by skate, care provided by first aid personnel, not wearing neck protection, sudden death

Figure 3. Key factors of the ice hockey injury.