What type of helmet is best for winter play?

January 20 2012

It's not winter in Canada if children don't spend time speeding down the slopes! Canadian tobogganing is a tradition handed down from generation to generation. For a long time, it's been considered one of the safest winter activities.

Unfortunately, the arrival of winter is followed by an increase in visits to hospital emergency departments by young people presenting with head injuries resulting from winter activities, including tobogganing. Fortunately, helmets are known to reduce the risk of head injury; but with so many helmet options available today, which is the best one? Dr. Michael Vassilyadi from the Children's Hospital of Eastern Ontario (CHEO) Research Institute, together with a research team at the University of Ottawa, put this question to the test. The results are published today in the *Journal of Neurosurgery: Pediatrics.*

"In activities such as tobogganing or skiing, children are able to attain very high velocities," explained Dr. Vassilyadi, Associate Professor in the Department of Surgery, Division of Neurosurgery at CHEO and co-author of this study. "This creates a disproportionate amount of risk considering their underdeveloped skills necessary to protect themselves during unexpected events, such as falling or running into objects or other people."

Currently, there is no certified winter recreational helmet available, so parents use what is available or no head protection at all. This study compared the protective characteristics of three types of helmets that are currently used by children ages 7 and under. Ice hockey, alpine ski, and

bicycling helmets were impacted at 2.0, 4.0, 6.0 and 8.0 metres/second at the front and side impact locations using a monorail drop rig in a lab setting. The impact surface and velocities were chosen to simulate an impact similar to that expected for a child during tobogganing.

"We defined helmet safety performance by the ability of a helmet to reduce acceleration of the head during the impact," said Dr. Blaine Hoshizaki, director of the Neurotrauma Impact Laboratory at the University of Ottawa, and co-author of this study. "Helmets are designed and tested to mitigate the risk of an injury; they are not designed to eliminate head injuries. Parents must be vigilant and educate their children about ways to be safe and have fun outdoors."

Depending on the impact velocity, the type of helmet significantly affected the risk of brain injury. The ice hockey helmet was the most protective at the lower-velocity impacts (2-6 metres/second), and the bicycle helmet was the most protective at the high-velocity impact (8 metres/second). Alpine helmets had limited effectiveness at both the low and high velocity impacts. This research provides insights regarding the limitations of the helmets, but confirms that all helmets are protective.

"This research study does not take a stand about the 'best' helmet," continued Dr. Vassilyadi. "A hockey helmet is likely the best for younger children when tobogganing as presented in this study. I think this is a great outcome because hockey helmets offer multi-impact protection by design; they can be worn with a toque; and a facial shield or cage can be easily added. The bottom line is that all helmets are protective – and young children should be wearing helmets during winter activities."

Provided by Children's Hospital of Eastern Ontario Research Institute