



## **Dr. Bishop a worthy winner of Pashby Safety Award**

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Patrick Bishop PhD has had a long distinguished career contributing to the reduction of head and spinal injuries in sports and particularly catastrophic injuries related to hockey. For over 30 years, Dr. Bishop has studied in this field, taught thousands of students, and dedicated years to research. As well he has given generously of his time to many member-based associations, providing technical expertise and strong leadership. This includes countless hours spent in the development of national standards for Canada and leading our country in the successful development and publication of international standards for protective equipment. And he has coached amateur hockey for the last 25 years.

His own schooling includes the University of Waterloo (B.Sc. 1964 and B.P.E. 1965), Western Illinois University (M.Sc. Ed 1970) and University of Minnesota (PhD 1974). Dr. Bishop's extensive education and experience in biomechanics provided the foundation for his teaching at the University of Waterloo, Department of Kinesiology and for conducting his research into the nature of specific catastrophic sport injuries. He has always been a strong advocate of applying research findings where it matters the most – on the ice, court or playing field.

For the last 30 years Dr. Bishop has served on various Canadian Standards Association (CSA) Technical Committees. He has been a member of the Canadian delegation to the International Standards Organization (ISO) on Ice Hockey since 1987 and has headed the delegation since 1995. For over 15 years he has been a member of the American Standards for Testing and Materials Technical Committee on Ice Hockey. And these are only some of his associations and memberships.

Dr. Bishop has been honoured previously with the following Awards:

- John Jenkins Award of Excellence 1998 for his outstanding national and international contributions to standardization in the field of sport safety, presented by Canadian Standards Association
- Geoffrey Dyson Award in 1995 for his contributions to the Science of Sport Biomechanics, presented by the International Society of Biomechanics in Sports
- University of Waterloo Athletic Hall of Fame in 1992
- Canadian Standards Association Award of Merit in 1992 for contributions to racquet sports eye protection

Dr. Bishop's knowledge and expertise are respected by his peers both nationally and internationally. It has been said that his devotion to the development of the best protective equipment is matched only by his love of the sport. Most definitely his work aligns with the mission of the Pashby Fund and the criteria of the Pashby Award.

His outstanding contributions in the field of catastrophic injury prevention make Dr. Pat Bishop a very worthy recipient of the Pashby Safety Award.



## Some ways Dr. Bishop's research has impacted on sports

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**Eye Protection in Racquet Sports** – In 1982 he was involved in testing several eye protectors intended to reduce the risk of eye injuries in sports such as squash and racquetball. This was done by firing squash balls and racquetballs at the devices which were mounted on a facially featured headform. The results showed protectors with lenses were able to keep the ball from striking the eye. However those without lenses (the so called open eye guards) permitted the ball to strike the eye. Those were deemed dangerous and in the standards work which followed this research, open eye guards were not permitted. As a result these devices disappeared from the marketplace.

**Hockey Face Mask Testing** – When face shields were first introduced in ice hockey they sat very close to the face. The early standards testing requirement for these devices involved quasi-static loading of the protector so that it deflected under a prescribed load. Dynamic testing in 1980 of these devices in Bishop's University of Waterloo laboratory (by propelling a puck at the device mounted on a facially featured headform) showed that they caved in with the potential for serious injury. As a result the CSA standard for face protectors was modified in two ways: 1) A dynamic puck test replaced the quasi-static test; 2) The protector was required to sit further away from the face.

**Bicycle Helmet Testing** – Bishop conducted bicycle helmet testing in 1984 to understand how these helmets performed under impact and to make recommendations for a Canadian Bicycle Helmet Standard. The most important finding was that helmets with polystyrene liners were only useful for a single impact because this liner crushed on impact and did not rebound, making the liner much less protective on a second impact. This is not as big a problem today as most bicycle helmets are now made with polypropylene liners.

**Cervical Spine Injury Mechanism** – When cervical spine injuries began to surface in hockey in the late 1970s and early 1980s, Bishop and his lab team conducted a number of experiments in order to better understand the mechanism of these injuries. Using a mechanical test dummy, propelled in free flight to strike a rigid fixed barrier, they were able to simulate a head first collision with the boards. With high speed film, complex transducers and computer processing, Bishop and his co-workers were able to demonstrate how the neck was broken under axial compressive loading. This work also showed that the requirements for protecting against this type of injury were very complex. Placing additional padding in the crown area of the helmet (as several people advocated at the time) was unworkable because so much padding would be needed the helmet would be non-wearable. This research led to hockey administrators and other safety advocates starting to educate players, parents and coaches to the dangers of crown first impact against a rigid surface.

**Hockey Helmets and Concussion** – This work illustrated the limits of protection from concussion provided by hockey helmets. By examining several concussive incidents in professional hockey, Bishop demonstrated that many are caused by a direct blow to the face or jaw, blows for which hockey helmets are unable to provide protection. At a hockey safety conference in Switzerland in 1999, Bishop coined the term ‘head checking’ and noted that this tactic had to be stopped if concussions were to be reduced. Bishop’s work showed that a blow to the face/jaw acts like a knockout punch in boxing and the hockey helmet is not able to provide protection from this check. As a result Bishop worked with several advocates to have rule changes implemented to stop head checking and to educate the hockey community to the dangers of this tactic.

## **A Few Bishop Opinions on Hockey's Catastrophic Injuries**

*Bishop has not only worked in his bio-mechanics laboratory, he has coached for 25 years and continues to do so as an assistant with the Wilfrid Laurier Golden Hawks men's hockey team. This man knows the theory and the practice of which he speaks.*

“One of the main reasons that catastrophic injuries continue to be a problem in sport and in hockey, is that I think there is a lack of respect. Players don't respect their opponents. They don't respect themselves and are quite willing to take all kinds of risks. And they don't respect the rules and nature of the game. As a result we get these catastrophic injuries continuing.”

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“The lack of respect in professional hockey stems from the macho attitude that players have around the game. First of all, the notion that on every perceived wrong, or every little hit, there has to be some level of payback. And the second thing is that if a player wears a face mask or a visor for example, that player is perceived to be something less of a person.”

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“We have to educate the players, their parents, the administrators, the coaches, virtually everybody involved in youth sport about the dangers associated with a particular game that they're playing. Players need to learn that their equipment isn't going to protect them from every virtual injury – that it's there for a purpose and doesn't give them impunity. They can't play with reckless abandon. They have to learn to play under control.”

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“Parents have to realize the game should be fun and should be a game in which their kids are safe. They should not be encouraging their children to try to play like professional hockey players in the sense of the risks they take. They should be encouraging their children to play at the highest level possible and yet within the rules of the game, and to make sure the fun aspect is still there.”