Reduction of Cranial Impact from High-Speed Lacrosse Shots Utilizing Multi-Durometer, External Helmet Padding: A "Deflection" Design

Chmura, Maximilian

Approximately 60% of concussions in men’s lacrosse are due to high-speed shots to the head from lacrosse balls. These shots may cause traumatic impact to the brain. This project studies the effect of adding different types of external padding to a lacrosse helmet in order to reduce and deflect impact to the head, thereby reducing concussion risk. The hypothesis is as follows: If a high-speed shot makes contact with a lacrosse helmet utilizing differing external padding types (i.e., without coating, low durometer soft-coating, high durometer soft-coating, or strips of three varying durometer coatings), then the one with the varying durometer soft coating will protect the head the best because the ball will deflect in the direction of the softer durometer material, thereby reducing the force to the head as measured in G’s. In this experiment, a fake head was mounted on a stiff garage spring and the helmet was placed on the head. Different pads were attached for each trial. A ball was launched at the helmet using an air gun. On average, the multi-durometer padding outperformed the others. The data support the hypothesis for both side and back impacts, and data from the back are highly significant. Hence, varying durometer padding added to the outside of a lacrosse helmet may reduce the impact of a lacrosse ball hitting one's head, thereby reducing the chance of concussion.

Awards Won: