

## Applying Artificial Neural Networks to Predict Speed Skater Impact Concussion Risk

**Authors :** Yilin Liao, Hewen Li, Paula McConvey

**Abstract :** Speed skaters often face a risk of concussion when they fall on the ice floor and impact crash mats during practices and competitive races. Several variables, including those related to the skater, the crash mat, and the impact position (body side/head/feet impact), are believed to influence the severity of the skater's concussion. While computer simulation modeling can be employed to analyze these accidents, the simulation process is time-consuming and does not provide rapid information for coaches and teams to assess the skater's injury risk in competitive events. This research paper promotes the exploration of the feasibility of using AI techniques for evaluating skater's potential concussion severity, and to develop a fast concussion prediction tool using artificial neural networks to reduce the risk of treatment delays for injured skaters. The primary data is collected through virtual tests and physical experiments designed to simulate skater-mat impact. It is then analyzed to identify patterns and correlations; finally, it is used to train and fine-tune the artificial neural networks for accurate prediction. The development of the prediction tool by employing machine learning strategies contributes to the application of AI methods in sports science and has theoretical involvements for using AI techniques in predicting and preventing sports-related injuries.

**Keywords :** artificial neural networks, concussion, machine learning, impact, speed skater

**Conference Title :** ICKHS 2023 : International Conference on Kinesiology and Health Studies

**Conference Location :** Honolulu, United States

**Conference Dates :** December 25-26, 2023