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# Real-time spatial variable measurement applications in human movement and injury prevention:A case study in assessment of personal speed in snow sports participants.

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Small wearable devices capable of logging real-time accelerometer, Global Positioning System and heart rate data provide the potential for powerful insights into human performance in sport, injury prevention and rehabilitation. These devices can be used to enhance human self-perception of speed in activities,where movement velocity greatly exceedshuman walking or running speeds, for which evolutionary capacity for self-judgment of speed has not developed. Improving perception of speed travelled may improve safety across a range of sports. Insnowsportsspeed is associated with both the appeal of the sport as well as risk of injury. This study determined actual and perceived distance and speeds travelled by participants over their day as well as in resort designated 'slow zones' in the 2010/11 seasonusing a small GPS and accelerometer data-logging device (SPI Elite GPSports Pty Ltd). Participants completed aquestionnaire describing their assessment of theirmaximum speed that day and their distance travelled.102 participants travelled 4.5kmor more during the data collection sessions. Mean age was 42.0, (9-80) years, with 39%females and 70% advanced/expert. Total skiing/boarding time was 497 hours (mean =4.52hours) covering 4,475 km (mean=43.87km). Paired sample t-tests of the estimated and actual maximum speeds were significant ($p \leq .000$). Participants were consistently unable to estimate distances they travelled and were unable to accurately estimate maximum speeds they achieved, with most substantially underestimating the velocity they were travelling in "slow zones." This finding indicates the potential need for mechanisms for enhancing self perception of speed in this sport.

## Biography

Gordon Waddington completed his PhD in 2000 at the University of Sydney. He commenced the inaugural Professorship in Physiotherapy at the University of Canberra, in Canberra Australia in 2009. His interest in the application of devices such as accelerometers as biosensor systems in human movement has lead to work in injury prevention and performance enhancement in a range of areas from athletes to falls prevention in the elderly.

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