

## Reducing On-Ice Injuries through Cognitive Training Background and Findings Summary

Jacob Greenshpan, Ph.D.\*

Youth sports have been challenged in the past several years with increasing severity of injuries at all levels of the sport. In particular, attention has been drawn to spinal cord and head injuries. Attempts have been made to reduce concussions via better physical conditioning, improved protective equipment, teaching athletes safer ways to hit and get hit, altering rules of contact and stricter enforcement of the rules. Yet, injuries are continuing at alarming rates.

In 2009, USA Hockey initiated an off-ice cognitive training program for its junior national teams, training at the National Training Development Program (NTDP). The goal was to increase on-ice performance. The evident results are impressive: in the past four years the teams won 15 gold medals out of 20 international tournaments they have participated in. The U18 National Team recorded an unprecedented four consecutive gold medals at the U18 IIHF world championships.

Cognitive training is applied in the form of a software-based training environment (dubbed the *Hockey IntelliGym*). The training program is automatically adapted to each trainee based on personal performance and progress. Personal adaptation ensures both training efficacy and personalized difficulty level. The training settings are flexible: players can train at their desired location and time while training data is being collected by the training servers and monitored online. Training is carried out twice a week, 30 minutes per training session.

It has been suggested that cognitive training may have significant impact on the on-ice injury rates. This hypothesis is based on the fact that **most injuries occur due to un-anticipated hits and therefore sport-specific cognitive training may foster players' ability to avoid placing themselves in situations where they might otherwise sustain a serious injury or reduced impact severity by anticipating it.**

This hypothesis has been examined\*\* by reviewing the medical records of 5 cohorts of U17 and U18 players at the NTDP (2007-2011, n=230, 859 medical

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records). Records of the 2 years (2010-2011) during which cognitive training has been carried out were compared to the previous 3 years. The researchers compared the ratio between hockey-related and non-hockey-related medical records during that 5-years period. **It was found that the rate of hockey-related injuries when cognitive training has been implemented had dropped by 15%** (from 74% before implementation of cognitive training to 63% after), while number of concussions dropped by 28%.

It is proposed to run additional studies further measuring the impact of cognitive training on sports related injuries, and especially he injuries. Such study may include wider age range, gender differences, team-related positions as well as type and severity of injuries inflicted and avoided. Applied Cognitive Engineering shall be glad to provide such an experiment with the needed software tools as well as respective cognitive training data.

\* Dr. Jacob Greenshpan is the Research Director for ACE Applied Cognitive Engineering, Inc.

\* This study is a retrospective analysis of medical information collected and provided by USA Hockey, the National Team Development Program.