

# Youth Ice Hockey Players' Concussion And Concurrent Cognitive And Sport-Specific Task Performance: A Single-Case Pilot Study.

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## Abstract

**Background:** Ice hockey players frequently suffer concussions, which can impair cognitive function. Participation in ice hockey typically necessitates the execution of multiple skills at once. It has been noted that when cognitive and locomotor activities are done simultaneously after a concussion in athletes, performance disadvantages appear that might not be apparent if the tasks were evaluated separately. This pilot study looked at how young ice hockey players responded to concussions while performing concurrent tasks that were related to the sport.

**Methods:** In this single-case pilot investigation, the performance of four male youth ice hockey players who had suffered concussions during the previous season was compared to that of ten healthy controls (mean age: 11.8 years; mean time since injury: 92.5 days). In addition to a visual interference test, participants also completed three ice hockey-specific activities in a random order (modified Stroop task).

**Results:** Participants who had a concussion during the ice hockey season prior and were younger than 58 days

After injury, all cognitive tests showed considerably worsened performance (higher cognitive dual task cost).

when using ice hockey-specific skills while doing the visual interference challenge (p 0.05).

**Conclusion:** This study serves as a first step in creating a sport-specific evaluation of functional performance in young ice hockey players who have suffered concussions to help guide safer return to play.

**Keywords:** Athletes; Youth; Concussion; Return to play; Ice hockey; Ecological validity

## Introduction

Concussion is described as “a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces” (p. 250) by the most recent international consensus [1]. It can cause short- or long-term symptoms (somatic, cognitive, and/or emotional), behavioural changes, and cognitive impairment. Functionally, these results may make it challenging to engage in worthwhile and significant tasks. According to estimates, engagement in recreation and sports causes up to 3.5 million concussions annually in the United States alone [2]. Furthermore, it has been asserted that concussion risk is highest in athletic settings where collisions are frequent [3]. The most frequent specific injury among young players in the sport of ice hockey, according to reports, is a concussion [4], where environmental risks including ice, boards, and fast speeds of play have been mentioned as contributory concerns [5].

Many athletes, whether young and old, prioritise getting back into the game after suffering a concussion, but it's important to proceed carefully when resuming full sport involvement. A secondary concussion event may result from a player returning to sport too soon (for example, before fully recovering from a concussion), which can increase symptoms and delay healing [6].

When an athlete gets a second concussion before the symptoms of their previous concussion have fully resolved, it may result in second-impact syndrome. Concussion [7] and have disastrous consequences [8]. From a functional standpoint, returning to play before the resolution of cognitive deficits, such as slowed reaction time [9], may limit one's ability to process and respond appropriately to potentially harmful situations (for example, contact from an opponent during a hockey game), where a secondary concussive event may result. Appropriate concussion management is advised to prevent any potential detrimental effects of returning to play too soon [1,7].

## Conclusion

Ice hockey is a highly cerebral sport that requires players to process and react quickly to a variety of concurrent stimuli. Concussion-related deficits in reaction time make it more difficult for young hockey players to escape potentially harmful situations (such as body contact from an opponent), which increases their risk of sustained, more severe brain damage. This pilot single-case descriptive study showed that concussed youth ice hockey players showed deficits in dual-tasking abilities when performing concurrent ice hockey-specific tasks, despite being up to

58 days postconcussion, reporting no post-concussion symptoms, and performing at a level comparable to non-injured controls on an isolated assessment of cognitive performance. The study's findings, which highlight the necessity for, It is necessary to confirm findings with bigger group-based research studies before utilising ecologically valid and sport-specific assessment techniques to produce a more precise measure of concussion recovery preparedness.

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