# Table tennis training for hockey goalies: An evaluation of a pilot program designed to enhance reaction time and hand-eye coordination

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## Background and Purpose

Research shows that participation in multiple sports early in an athlete's development can have benefits for young athletes, including fewer injuries, enhanced movement skills, and a greater likelihood of long-term sport participation (Côté & Vierimaa, 2014; LaPrade et al., 2016). In addition, skills developed in one sport have the potential to transfer into other sports (Baker, Cobley, & Fraser-Thomas, 2009), which could improve overall sport performance.

With this research in mind, two sports in the Northwest Territories—table tennis and hockey—came together to develop a pilot program. From February 23 to April 4, 2021, seven hockey goalies aged nine to 15 years old participated in a 6-week table tennis training program in Hay River, Northwest Territories. The goal of this program was to improve the goalies' hand-eye coordination and reaction time both on and off the ice. The program was born out of a partnership between Table Tennis North, Table Tennis Canada, Hockey NWT, Hockey North, and Hay River Minor Hockey.

The Sport Information Resource Centre (SIRC) was contracted to evaluate this pilot program. The purpose of this evaluation was to assess if, and to what to extent, the 6-week table tennis program increased participants' hand-eye coordination and reaction time. A secondary purpose was to explore participants' experiences in and perceptions of the program.

## Methods

With assistance from program leaders, the SIRC research team collected and analyzed three types of information from program participants for this evaluation:

- **Demographic characteristics and sport histories** via participant intake forms
- **On- and off-ice performance measures** before and after the program
- **Experiences in and perceptions of the program** via exit interviews

These measures are described below. Additional information and resources are included in the appendices.

***Demographic characteristics and sport histories***

Before starting the program, each goalie (or a parent/guardian) completed a participant intake form. The form included basic demographic information for each participant, such as gender and date of birth. In addition, the form included detailed information about the participant's current and previous involvement in hockey, table tennis, and other sports. A copy of the participant intake form is included in Appendix A.

***On- and off-ice performance measures***

To assess the effectiveness of the table tennis training program, participants completed three tests to assess hand-eye coordination, reaction time, and goalie performance. Participants completed each test once on the first day of the program, and again on the last day of the program. These tests included:

1. Off-ice hand-eye coordination (alternate hand wall toss)
2. Off-ice computer reaction time (RED LIGHT-GREEN LIGHT reaction time test)
3. On-ice save percentage (the number of goals allowed out of 10 slapshots)

Instructions and materials needed for each test are included in Appendix B.


***Figure 1.*** *Timeline for on- and off-ice performance measures.*

A member of the SIRC team performed a statistical analysis to determine if the table tennis training program led to improvements in hand-eye coordination, reaction time, and save percentage. In other words, we compared the results of each test **before** and **after** the intervention to determine if any significant changes occurred.

***Experiences in and perceptions of the program***

To conclude the evaluation, a member of the SIRC team interviewed a sample of participants (*n* = 5) via phone or Zoom video calls. All interviews took place within three weeks of the last day of the program. During the interviews, we asked participants about their reasons for

participating, their expectations for the program, what they liked about the program, what could be improved, the benefits of participating, and if they were satisfied with the program.

With permission from each participant and a parent or guardian, we audio-recorded and transcribed the interviews, then summarized their responses for the report. A copy of the interview guide is included in Appendix C.

## Results

### *Demographic characteristics and sport histories*

Seven goalies participated in the program, including six who identified as boys and one who identified as a girl. Three of the goalies identified as Indigenous. The goalies ranged in age from nine to 15 years, with an average age of 12.

The youngest participant competed at the Atom (U11) level, while the oldest competed at the Minor Midget (U16) level. All participants identified "goalie" as their primary position in hockey. On average, participants started playing hockey at the age of five years and participate in organized hockey for six months each year. During the hockey season, participants reported engaging in two-to-four practices and one-to-two games per week. Older players participated in hockey more frequently than younger players.

Only two participants had played table tennis before participating in the program, either at home or at a friend's house, several times a year. Six of the participants reported participating in structured (e.g., swimming lessons, baseball) and/or unstructured (e.g., knee-boarding, snowshoeing) sport activities outside of hockey or table tennis throughout their life. One participant did not fill out the section of the form focused on other sport activities.

### *On- and off-ice performance measures*

On average, **participants improved their off-ice hand-eye coordination by 20.5%** after participating in the table tennis training program. For individual results, see Figure 2.

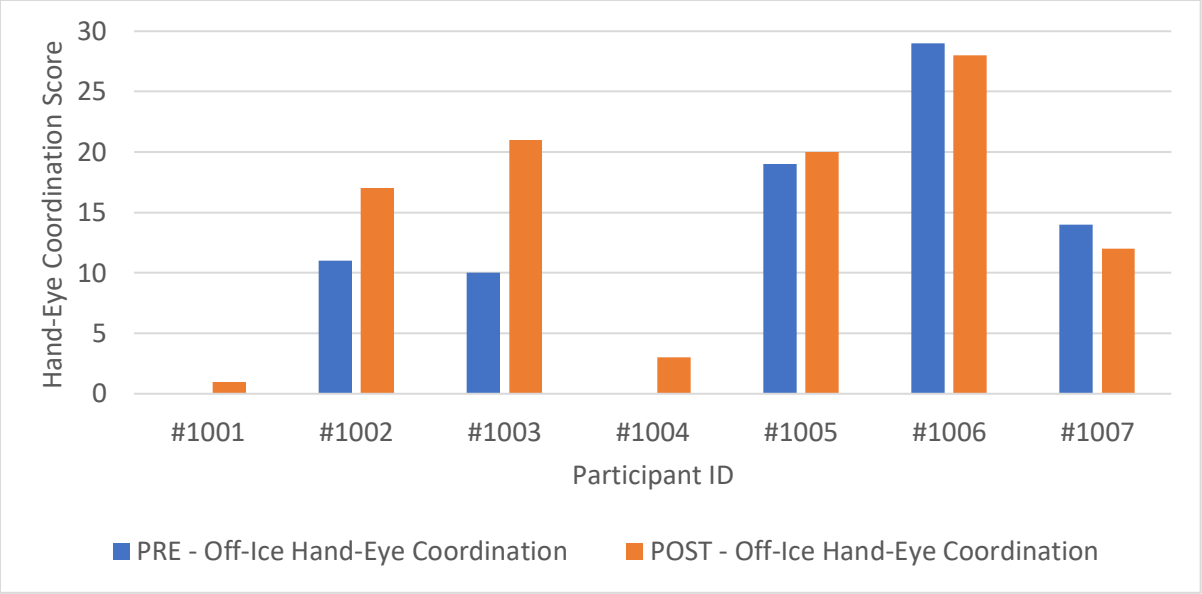


***Figure 2.*** *Participants' off-Ice hand-eye coordination scores before and after the table tennis training program.*

**Participants' off-ice computer reaction time, on average, increased by 9.7%** following the table tennis training program. Individual results are presented in Figure 3.

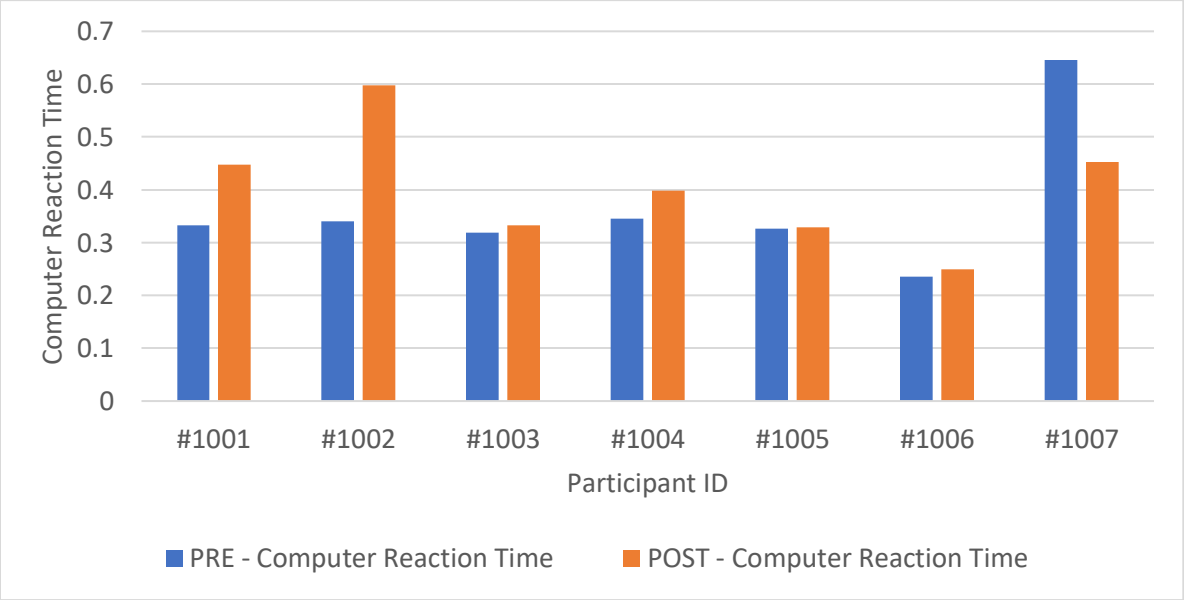


***Figure 3.*** *Participants' off-ice computer reaction time scores before and after the table tennis training program.*

On the final test, **participants improved their on-ice save percentage by 15.8%** following the table tennis training program. Figure 4 presents individual save percentage results.

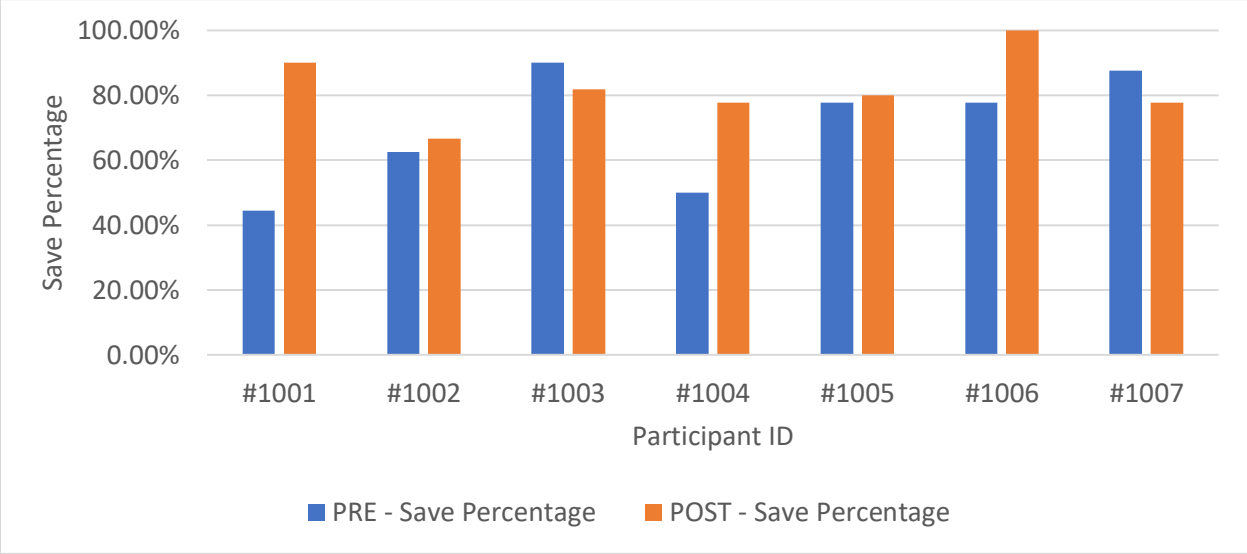


***Figure 4.*** *Participants' on-Ice save percentage before and after the table tennis training program.*

***Experiences in and perceptions of the program***

When asked about their reasons for joining the program, several participants emphasized that it was a new opportunity specifically for goalies, which is especially uncommon in the North.

> *"In the north, there's not a lot of special training. So, the fact that we had a program here to give us goalies a little bit of help, it was just an opportunity that I didn't want to miss."*

Several participants thought the program would make them better goalies and improve hand-eye coordination. Other participants just wanted to have fun and spend time with their friends.

> *"I thought it'd be a good opportunity to try something new. And I was also interested in the sport of ping-pong."*

Three participants stated that the program met their expectations. The other two participants either came in with no expectations or expected something different, but still enjoyed the program. All participants reported feeling satisfied with the program.

> *"I thought we were going to be doing more goalie stuff, in our gear. But it was honestly still fun."*

In terms of benefits, all participants stated that the program was fun, they improved some skills, and they feel more confident in their skills as a goalie after participating in the program.

> *"It was really fun, and it was a nice break to try something new and exciting."*

All participants described improvements in their table tennis skills. Participants also described more general improvements in physical and mental skills that could improve sport performance, such as agility, focus, and hand-eye coordination.

> *"I thought that it would slightly improve my hand-eye coordination and reflexes, but it helped a lot actually."*

In addition, many participants felt that the table tennis program improved hockey-specific skills such as their ability to track and catch pucks.

> *"I definitely noticed a change. I noticed that I was tracking pucks a lot better."*

Everyone thought that the program made them a better goalie in at least a small way.

> *"I feel better knowing that I can react to pucks better."*

Overall, participants had fun learning a new sport and felt that the program was a "safe space" for learning. They valued the opportunity to develop skills and confidence that made them feel like a better goalie, especially because these opportunities are harder to access in the North.

> *"It was a safe space and we're here to learn something. So, if you make accidents, that was fine. And it was honestly just really fun."*

Many participants also enjoyed working with the instructors and hanging out with the other people in the program.

> *"It was great to have the special instructor goalies."*

To make the program better, a couple of participants noted that greater integration of on-ice training might make the program more interesting.

## Summary and Key Takeaways

- Seven hockey goalies between the ages of nine and 15 years, including six who identified as boys and one who identified as a girl, participated in a six-week table tennis training program designed to improve hand-eye coordination and reaction time.
- On average, the goalies had been playing hockey since they were five years old. Only two of the goalies had previous experience playing table tennis.
- Following the table tennis training program, the goalies improved their:
    - Off-ice hand-eye coordination by 20.5%
    - Off-ice reaction time by 9.7%
    - On-ice save percentage by 15.8%
- Overall, the goalies showed significant improvements on two out of three skills tested before and after the program. Most importantly, they showed good on-ice progress.
- Participants valued the opportunity to develop new skills and work with specialized instructors, especially because these opportunities are harder to access in the North.
- To make the program better, a couple of participants noted that greater integration of on-ice training might make the program more interesting.
- All participants stated that the program was fun, they improved some skills, and they feel more confident in their skills as a goalie after participating in the program. Everyone thought that the program made them a better goalie in at least a small way.

## References


Baker, J., Cobley, S., & Fraser-Thomas, J. (2009). What do we know about early sport specialization? Not much! *High Ability Studies*, *20*(1), 77-89. https://doi.org/10.1080/13598130902860507

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