# Concussion symptoms during the competitive hockey season explained by repeated head impacts

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## INTRODUCTION

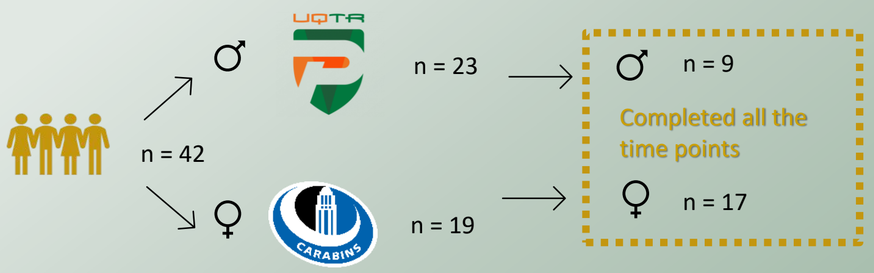
Sport-related concussion (SRC) and **repetitive head impacts** (RHI) are growing concern in contact sports. While concussions are clinically recognized injuries, RHI do not necessarily produce immediate symptoms, but athletes are exposed to these impacts, which can **alter brain** microstructure without producing clinical symptoms. Monitoring symptom fluctuations throughout the season may help better understand the short-term effects of RHI exposure in university hockey players.

### AIMS

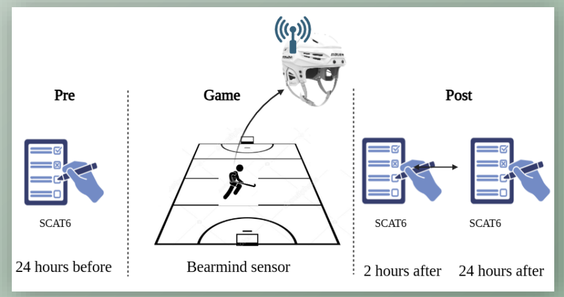
1. **Main objective**: Examine the relationship between RHI exposure and short-term fluctuations in concussion-related symptoms across a full competitive university hockey season.
2. **Sub-objective**: Compare the relationship between RHI exposure and symptom fluctuations between male and female athletes.

## METHODS

### Participants




### Measures




## RESULTS

**Table 1**. Demographic data of players who completed all the survey

| | Male | Female | Both |
|---|---|---|---|
| Number of athletes | 9 | 17 | 26 |
| Age (years) [mean±SD] | 23,1 ± 1,3 | 22,9 ± 1,6 | 23 ± 1,5 |
| Height (cm) [mean±SD] | 183,3 ± 6,6 | 167,5 ± 6,2 | 173 ± 9,9 |
| Weight (kg) [mean±SD] | 85,7 ± 7,7 | 68,5 ± 6,6 | 74,4 ± 10,8 |
| Observations (n) | 44 | 157 | 201 |
| Impacts [mean±SD] (max) | 1,36 ± 1,6 (6) | 0,39 ± 0,69 (3) | |

**1** **Most athletes remained asymptomatic despite RHI exposure.**

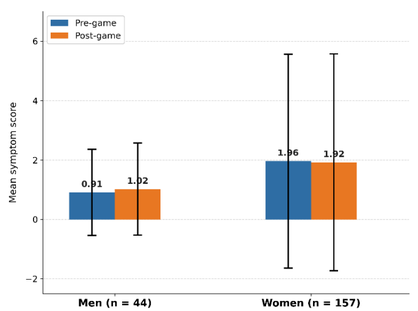



**Figure 1**. Pre- vs. post-match symptom scores

**2** **Symptom fluctuations showed weak associations with head impact exposure.**

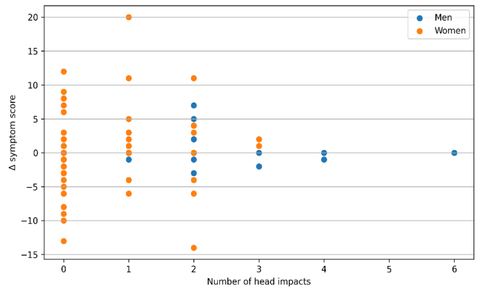



**Figure 2**. Relationship between head impacts and symptom fluctuations

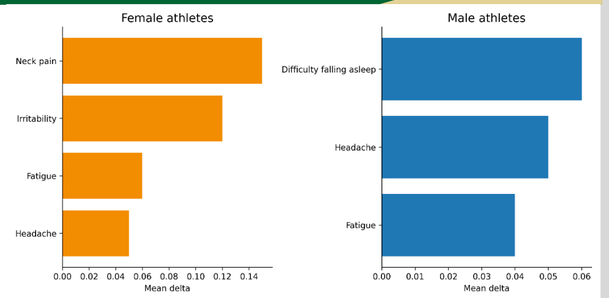



**Figure 1**. Pre- vs. post-match symptom scores

**3** **No symptom progression across the season.**

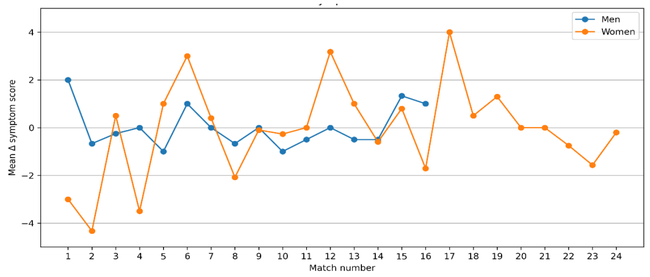



**Figure 1**. Mean Δ symptom scores cross matches in male and female athletes

Playing time emerged as the most consistent predictor of symptom fluctuations.
→ Ahtletes with greater playing time tended to report fewer symptoms.

## CONCLUSION

- No cumulative symptom progression was observed despite repeated head impact exposure.
- Associations between biomechanical exposure metrics and symptoms remained weak and highly variable.
- RHI appeared to induce transient rather than progressively accumulating symptom fluctuations.

## REFERENCES

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