


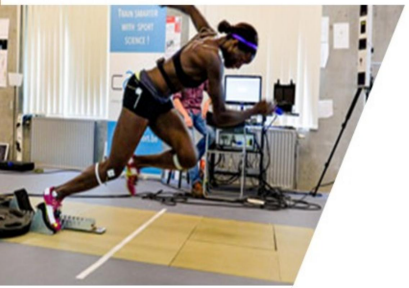


Differences in Symptom Duration and Return to Sport Following SRC Between French-Speaking Canadian and European Athletes

Martens G, Thibaut A, de Beaumont L, Beaudart C, Bodet C, Urhausen A, Tscholl PM, Romeas T, Le Garrec S, Hannouche D, Seil R, ***Kaux JF,*** *Leclerc S*

ReFORM - Réseau Francophone Olympique de Recherche en Médecine du Sport



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British Journal of Sports Medicine

Consensus statement

Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport–Amsterdam, October 2022 FREE

WORLD RUGBY

JOURNAL DE TRAUMATOLOGIE DU SPORT

Consensus du Comité International Olympique (CIO)

Commotions cérébrales dans le sport: synthèse ReFORM de la déclaration de Consensus de la 6e Conférence internationale

Concussion in sport: ReFORM synthesis of the consensus statement from the 6th International Conference

?



The Case for Geographic Diversity in SRC Research

What We Know

CISG 2022 meta-analysis
Median symptom resolution: 14 days
Median RTS: 20 days

Known modifying factors:
Sex, age, initial symptom severity, access to care, sport type

Literature bias:
>80% of SRC studies from English-speaking countries (USA, CAN, EUR, AUS)

The Gap

Geographic origin
→ Largely unexamined as a modifier
→ Social determinants often excluded via 'language barrier' criteria

French-speaking community
→ Severely under-represented
→ No cross-continental comparison previously reported

→ Healthcare systems, cultural norms & SRC protocols differ substantially between Canada and Europe



Clinical Journal of SPORT MEDICINE
Founded in 1990 by the Canadian Academy of Sport and Exercise Medicine

Athletes' experience ?

ORIGINAL RESEARCH

Sport-Related Concussion Knowledge in French-Speaking Athletes, Coaches, and Health Care Professionals: Results From an International Survey on 2073 Participants

Martens, Géraldine PhD[*,†,‡,§,¶,‖]; Thibaut, Aurore PhD[‖,**]; Urhausen, Axel MD, PhD[††,‡‡,§§]; Tscholl, Philippe M. MD, PhD[§§,¶¶]; Beaudart, Charlotte PhD[‖‖]; Romeas, Thomas PhD[*,***]; de Beaumont, Louis PhD[†,‡]; Caron, Jeffrey G. PhD[†††,‡‡‡]; Le Garrec, Sébastien MD, PhD[§§,§§§]; Hannouche, Didier MD, PhD[§§,¶¶]; Seil, Romain MD, PhD[††,‡‡,§§]; Kaux, Jean-François MD, PhD[§,¶,§§]; Leclerc, Suzanne MD, PhD[*,§§]

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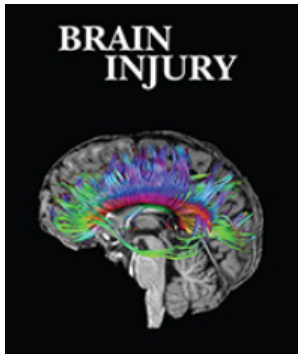
Athletes' experience



Research Article

Differences in symptom duration and return to sport following sport-related concussion between French-speaking Canadian and European athletes

Géraldine Martens, Aurore Thibaut, Louis de Beaumont, Charlotte Beaudart, Colin Bodet, Axel Urhausen, Philippe M. Tscholl, Thomas Romeas, Sébastien Le Garrec, Didier Hannouche, Romain Seil, Jean-François Kaux & Suzanne Leclerc ...show less

https://doi.org/10.1080/02699052.2026.2617450



Objectives & Hypotheses

PRIMARY OBJECTIVE

Compare self-reported SRC symptom duration and return-to-sport (RTS) timelines across geographic origins and sport demographics in a large international French-speaking cohort.

SECONDARY OBJECTIVE

Examine combined influence of geographic origin, sex, age, professional status, and SRC risk category via multivariate logistic regression.

HYPOTHESIS

Intercontinental differences in SRC recovery would emerge due to differences in culture, healthcare access, SRC public awareness, and return-to-play protocol implementation between Canada and Europe.



Study Design & Data Collection

DESIGN

Cross-sectional multicentric survey (Dec 2020 – Mar 2021)

Approved by 3 ethics committees

PARTICIPANTS

French-speaking athletes ≥14 y

All sports & levels

ReFORM network (BE, CA, FR, LU, CH)

SURVEY

33-item electronic survey (FR)

SRC knowledge, detection tools, management protocols

ANALYSIS

Wilcoxon rank-sum

Chi-square tests

Binary logistic regression

R 4.4.1

This study is a secondary analysis of the ReFORM SRC knowledge survey (primary analysis: Martens et al., Clin J Sport Med 2025). Outcomes: longest symptom duration & average sports interruption length (self-reported).



Cohort Overview: 998 Athletes

998
Total respondents
(84% completion rate)

635
French-speaking
Canadian athletes

363
European athletes
(BE, FR, LU, CH + other)

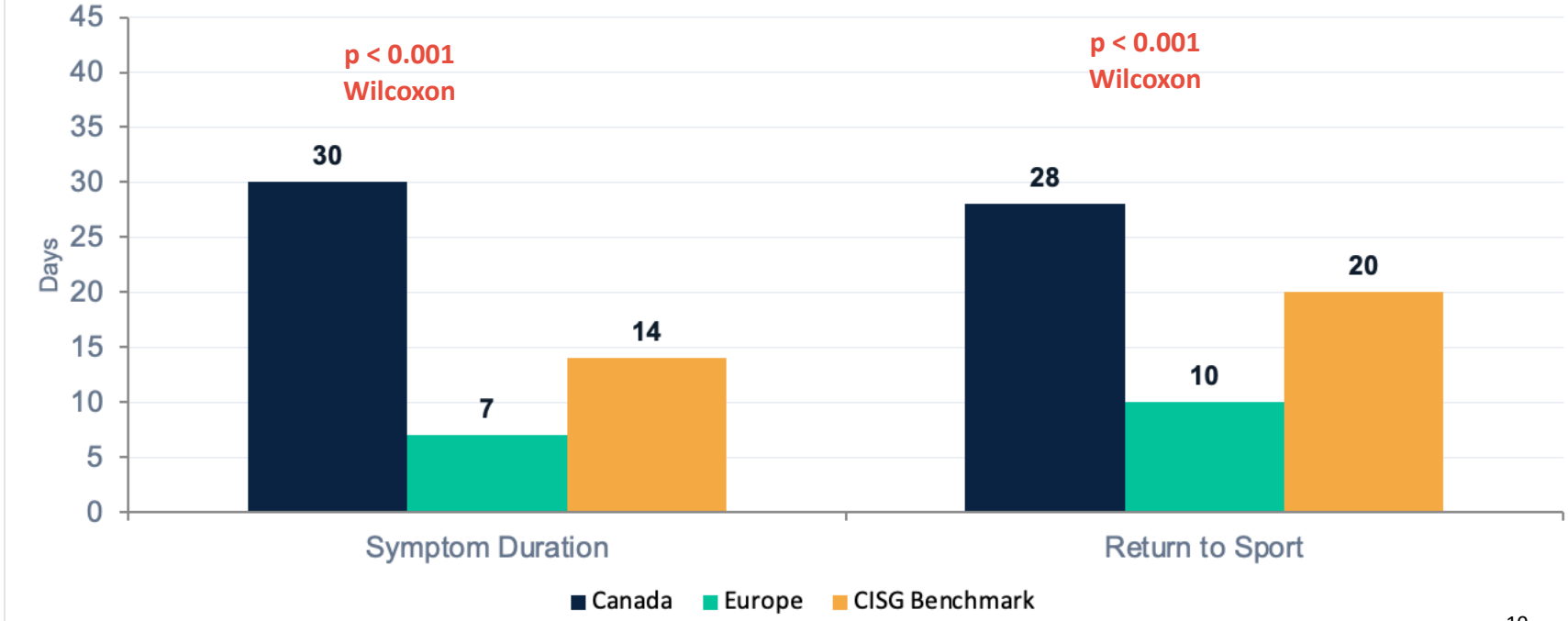
409
Athletes with
SRC history (41%)

Key Between-Group Differences (Canada vs. Europe)

Variable	Canada (n=635)	Europe (n=363)	p-value
SRC history	49.7%	29.9%	< 0.001
Sex (female)	53.3%	45.9%	0.037
Minor athletes	53.9%	33.9%	< 0.001
Professional level	49.1%	75.3%	< 0.001
High-risk sport	29.7%	52.0%	< 0.001



Medians at a Glance vs. CISG Benchmarks



All values are medians. CISG benchmarks from Putukian et al. Br J Sports Med 2023 (meta-analysis, 6th Consensus Conference)



Predictors of Prolonged Symptom Duration (> 14 days)

Binary logistic regression · AIC = 451.37

Predictor	β	SE	z	p-value	OR	95% CI
Europe (vs. Canada)	−1.68	0.31	−5.46	< 0.001***	0.19	[0.10, 0.33]
Male sex (vs. Female)	−0.83	0.23	−3.56	< 0.001***	0.44	[0.28, 0.69]
Minor (vs. Adult)	−0.34	0.24	−1.43	0.152	0.71	[0.44, 1.13]
Professional (vs. Amateur)	0.36	0.24	1.46	0.144	1.43	[0.89, 2.31]
SRC risk (high → low)	0.19	0.16	1.20	0.229	1.21	[0.89, 1.65]

OR < 1.0 indicates reduced odds of prolonged symptom duration relative to reference group.

Only geographic origin (OR = 0.19) and sex (OR = 0.44) were significant predictors. Age, sport level, and SRC risk category were not.



Predictors of Prolonged Return to Sport (> 20 days)

Binary logistic regression · AIC = 379.21

Predictor	β	SE	z	p-value	OR	95% CI
Europe (vs. Canada)	−1.65	0.32	−5.22	< 0.001***	0.19	[0.10, 0.35]
Male sex (vs. Female)	−0.95	0.26	−3.67	< 0.001***	0.39	[0.23, 0.64]
Minor (vs. Adult)	−0.23	0.26	−0.86	0.388	0.80	[0.48, 1.33]
Professional (vs. Amateur)	−0.19	0.27	−0.70	0.485	0.83	[0.49, 1.40]
SRC risk (high → low)	0.15	0.18	0.84	0.401	1.16	[0.82, 1.64]

Consistent with symptom duration model: same two predictors, same effect direction, same magnitude of OR.

European athletes: 81% less likely to have prolonged RTS (OR = 0.19). Male athletes: 61% less likely (OR = 0.39).



Female Athletes: Consistently Longer Recovery

FEMALE ATHLETES

Symptom duration: 30 days (median)

RTS duration: ~32 days (median)

OR prolonged symptoms: Reference (female)

MALE ATHLETES

Symptom duration: 14 days (median)

RTS duration: ~18 days (median)

OR prolonged symptoms: 0.44 vs. female (p<0.001)

Proposed mechanisms behind sex differences:

1 Hormonal factors

Estrogen fluctuations across menstrual cycle influence symptom severity. Hormonal contraceptives and menarchal status further modulate outcome (Gallagher et al., 2018; Bazarian et al., 2010).

2 Reporting behaviour

Females more forthcoming in disclosing SRC symptoms — may inflate apparent symptom duration. Reporting bias should be accounted for in future studies (Kerr et al., 2016; Torres et al., 2013).

3 Baseline symptom scores

Females exhibit higher pre-injury baseline symptom scores, complicating outcome attribution. Individual baseline assessment is essential (Ono et al., 2016; Zuckerman et al., 2014).



Why Do Canadian Athletes Report Longer Recovery?

1 Superior SRC Awareness & Detection

Greater SRC knowledge in Canada (Martens et al., Clin J Sport Med 2025) → more symptoms identified → longer apparent duration. Cultural & media attention to high-risk sports (ice hockey). Trend confirmed by increase then stabilization of Canadian SRC reports over 2 decades (Gordon & Kuhle, 2022).

2 Self-Reporting Culture

Willingness to continue playing and team allegiance linked to under-reporting in European adolescents. Absence of systematic return-to-play protocol enforcement in Europe may mask true recovery timelines. Literature on trans-Atlantic reporting attitudes remains largely unexplored.

3 Differential Access to Care

Romeas et al. (BJSM 2024, n=133 Olympic athletes): early care (≤7 d) → median RTS 26 d vs. late (≥8 d) → 45 d. European subsample predominantly professional (82.7%) → faster multidisciplinary access + financial pressure to return quickly.

4 Protocol Standardisation Gap

Canada: Parachute, Smart Hockey, concussion MOOC — well-established structured RTS frameworks. Europe: FIFA guidelines less penetrant; no equivalently standardised, population-wide concussion management framework (Martens et al., 2022).

Higher IQR variability in Canada suggests outliers with very prolonged recovery driving the median up — not a uniform shift.



A Concerning Pattern in Canadian Athletes

Symptom duration: 30 days

Return to sport: 28 days

RTS BEFORE SYMPTOM RESOLUTION?

Implications

- CISG Amsterdam 2022: 6-step graduated RTS — each step ≥24h, introduced after complete symptom resolution → minimum 6 days post-injury.
- In Canada: median RTS (28d) < median symptom duration (30d) — raises questions about protocol adherence and symptom-free clearance.
- In Europe: RTS (10d) > symptom duration (7d) — pattern consistent with CISG-compliant clearance despite shorter absolute durations.
- Caveat: retrospective self-report; no question about symptom-free waiting period. Recall bias may inflate the gap.



Methodological Considerations

Retrospective self-report

Symptom and RTS durations are recalled, not prospectively captured. Substantial risk of recall bias, especially for remote injuries. Data should be interpreted as self-perceived rather than clinician-verified durations.

Selection & sampling bias

Online anonymous survey with no confirmed response rate. Canadian respondents far outnumber Europeans (635 vs. 363), and European subsamples differ structurally (more professional, older, higher-risk sports) — complicating direct geographic comparisons.

No country-level stratification in Europe

European sample too small for country-level analysis (BE n=162, LU n=73, FR n=61, CH n=14). 'Europe' subsample lumped despite potentially heterogeneous healthcare contexts.

No clinician verification

Concussion diagnosis not validated by a clinician; SRC history is self-declared. True SRC prevalence may differ from reported rates. No data on access to multidisciplinary care or specific treatments received.

Confounding by sport mix

Significant inter-group differences in sport type (e.g., more martial arts and rugby/football in Europe; more skating, baseball, cheerleading in Canada) may confound geographic comparisons despite adjustment in logistic regression.

No symptom-free confirmation

Survey did not explicitly ask whether athletes were symptom-free before returning to sport. The RTS < symptom duration finding in Canada may reflect recall imprecision rather than premature return.



What This Means for Practice and Research

CLINICAL PRACTICE

- Culture-sensitive concussion care: SRC management protocols must account for local awareness, access to care, and self-reporting norms.
- Female athletes warrant enhanced monitoring — longer trajectory regardless of geography. Baseline symptom assessment is essential.
- European practitioners should not assume short recovery = complete recovery; structured RTS protocols (CISG 6-step) must be explicitly communicated.
- Canadian practitioners should verify symptom-free status before clearing athletes — median RTS < symptom duration raises protocol adherence questions.

RESEARCH PRIORITIES

- Prospective multicentric studies within the French-speaking community to capture real-time symptom and RTS data.
- Country-level stratification in Europe — Belgium, France, Luxembourg, Switzerland have distinct healthcare systems and SRC guideline implementation.
- Investigate self-reporting behaviours and cultural attitudes toward SRC disclosure across North American and European contexts.
- Assess access to multidisciplinary care as a primary moderator of recovery in large prospective cohorts, controlling for sport type and sex.



Conclusions

01	Geographic origin is a significant, independent predictor of both symptom duration and RTS following SRC — after adjusting for sex, age, sport level, and SRC risk.
02	Canadian athletes report 4× longer median symptom duration (30 vs. 7 days) and 3× longer RTS (28 vs. 10 days) compared to European athletes.
03	Female sex independently predicts prolonged symptom duration (OR 0.44 for males) and RTS (OR 0.39 for males) — mechanisms remain incompletely understood.
04	Age, professional status, and SRC risk category did not significantly influence recovery durations in this cohort.
05	Culture, SRC awareness, self-reporting norms, and protocol implementation are underappreciated determinants of recovery — deserving prospective, cross-cultural investigation.

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Thank you for your attention!

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