

# Barriers to and facilitators of return to learning following a sport-related concussion

## Perspectives of female secondary school students

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### Abstract

**Objective** To identify barriers to and facilitators of return to learning (RTL) for female secondary school students following a sport-related concussion (SRC), and to identify critical junctures on the injury-to-recovery continuum that can be targeted to enhance the RTL process.

**Design** A grounded theory approach using in-depth qualitative interviews.

**Setting** Secondary schools within the York Region District School Board in Ontario.

**Participants** Ten female secondary school students who presented to a sports medicine physician with an SRC in 2015 or 2016. Five of the students received a Green Folder intervention containing an RTL strategy, while 5 students received no RTL intervention following their SRC.

**Methods** In-depth interviews were conducted in person or by telephone. All interviews were audiorecorded and transcribed. The transcriptions were analyzed, coded, and examined for common themes by 2 independent reviewers.

**Main findings** Barriers to RTL included a lack of a graduated RTL process, students' own internal stress, poor communication of expectations, lack of concussion education, and inadequate support from teachers. Facilitators of RTL included academic accommodations and having a primary contact person within the school system. Owing to inconsistent implementation, the impact of the Green Folder intervention as a facilitator of RTL remains unknown.

**Conclusion** Results of this study support existing findings in the realm of concussion research. A novel finding includes the importance of a primary contact person as a facilitator of RTL. This person could help to overcome some of the identified barriers to RTL and improve outcomes by assisting with academic accommodations, providing reassurance regarding these accommodations, improving education among teachers and students, and enhancing communication between stakeholders.

### Editor's key points

► Compared with adults, adolescents may be more vulnerable to the effects of a sport-related concussion (SRC) given their ongoing neurodevelopment. The cognitive sequelae of an SRC can negatively affect academic performance, and the cognitive stress of school can hinder restoration of neurologic functioning. Timely individual academic accommodations can improve the time to postconcussion symptom resolution.

► As previous research suggests that female students take longer to return to learning (RTL) and that symptoms tend to recur more commonly than among male students, this study aimed to assess an RTL intervention, the Green Folder, among female secondary school students, and to identify barriers to and facilitators of RTL following an SRC.

► Possibly owing to inconsistent implementation, this study found that regardless of the Green Folder intervention, all students felt accommodated, most were able to maintain or improve their grades, and the length of time until feeling back to "normal" varied. A lack of communication was a key barrier to RTL, and the students' own stress was identified as a possible explanation for the longer recovery period for female students. An initial meeting among stakeholders before RTL to establish expectations and identify a primary contact person could improve communication.

## Points de repère du rédacteur

► Les adolescents peuvent être plus vulnérables que les adultes aux effets d'une commotion cérébrale liée au sport (CCS) en raison de leur neurodéveloppement inachevé. Les séquelles cognitives d'une CCS peuvent nuire au rendement scolaire, et le stress cognitif à l'école peut entraver le rétablissement de la fonction neurologique. Des accommodements pédagogiques individuels, offerts en temps opportun, peuvent raccourcir la période nécessaire à la disparition des symptômes liés à une commotion cérébrale.

► Comme des recherches antérieures laissaient entendre que les étudiantes ont besoin de plus de temps pour le retour aux études (RAE) et que la récurrence des symptômes a tendance à être plus fréquente que chez leurs homologues masculins, cette étude visait à évaluer une intervention pour le RAE, appelée Green Folder, chez des étudiantes du niveau secondaire et à cerner les facteurs qui nuisaient au RAE après une CCS ou qui le facilitaient.

► En raison, peut-être, d'un manque d'uniformité dans la mise en œuvre, l'étude a observé que, nonobstant l'intervention Green Folder, toutes les étudiantes ont jugé qu'elles avaient eu des accommodements, la plupart avaient été capables de maintenir ou d'améliorer leurs notes, et le temps requis pour se sentir revenues «à la normale» variait. Le manque de communication était un obstacle important au RAE, et le stress ressenti par les étudiantes elles-mêmes a été identifié comme une explication possible de la période plus longue nécessaire au rétablissement des étudiantes. Une réunion initiale entre les intervenants concernés avant le RAE pour définir les attentes et identifier une personne-ressource responsable pourrait améliorer la communication.

# Retour aux études après une commotion cérébrale liée au sport: obstacles et facilitateurs

## Points de vue d'étudiantes du niveau secondaire

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### Résumé

**Objectif** Cerner les obstacles au retour aux études (RAE) rencontrés par des étudiantes du niveau secondaire après une commotion cérébrale liée au sport (CCS), de même que les facilitateurs du RAE, et identifier les jalons critiques dans le continuum entre la blessure et le rétablissement, qui pourraient être ciblés pour améliorer le processus du RAE.

**Type d'étude** Une approche à base empirique à l'aide d'entrevues qualitatives approfondies.

**Contexte** Des écoles secondaires du conseil scolaire du district de la région de York, en Ontario.

**Participants** Dix étudiantes du niveau secondaire qui ont consulté un médecin spécialisé en médecine sportive ayant subi une CCS en 2015 ou 2016. Cinq étudiantes ont fait l'objet d'une intervention Green Folder comportant une stratégie de RAE, tandis que 5 étudiantes n'ont fait l'objet d'aucune intervention à la suite de leur CCS.

**Méthodes** Des entrevues approfondies ont été menées en personne ou par téléphone. Toutes les entrevues ont fait l'objet d'un enregistrement sonore et d'une transcription. Les transcriptions ont été analysées, codées et examinées par 2 réviseurs indépendants pour dégager des thèmes communs.

**Principales constatations** Parmi les obstacles au RAE figuraient l'absence d'un processus progressif de RAE, le stress interne ressenti par les étudiantes, une communication déficiente des attentes, le manque d'éducation sur les commotions cérébrales et le soutien insuffisant des enseignants. Des accommodements pédagogiques et l'identification d'une personne-ressource responsable au sein du système scolaire ont facilité le RAE. En raison du manque de cohérence dans sa mise en œuvre, l'efficacité de l'intervention Green Folder en tant que facilitateur demeure inconnue.

**Conclusion** Les résultats de cette étude corroborent les constatations existantes dans les diverses recherches sur les commotions cérébrales. L'importance d'identifier une personne-ressource responsable en tant que facilitatrice du RAE représente une nouvelle constatation. Une telle personne pourrait aider à surmonter certains des obstacles identifiés et à améliorer les résultats en aidant à la mise en place d'accommodements pédagogiques, en rassurant les étudiantes concernant ces accommodements, en sensibilisant davantage les enseignants et les étudiants aux commotions cérébrales, et en améliorant la communication entre les intervenants concernés.

Compared with adults, adolescents may be more vulnerable to the effects of a sport-related concussion (SRC) given their ongoing neurodevelopment.<sup>1,2</sup> While not all youth will return to sport after a concussion, all youth must return to school.<sup>3</sup> The cognitive sequelae of an SRC can negatively affect academic performance, and the cognitive stress of school can hinder restoration of neurologic functioning.<sup>4-7</sup> Academic accommodations that are individualized to the needs of each student and administered in a timely manner can improve the time to postconcussion symptom resolution.<sup>8-10</sup> This requires a coordinated effort between family, educators, and physicians.<sup>11</sup>

Unfortunately, systematic reviews highlight the continuing lack of high-quality research to guide effective return to learning (RTL) and other activities following an SRC.<sup>11,12</sup> A systematic review by Purcell et al outlines factors that should be considered in RTL and identifies 6 articles that have examined strategies for the provision and receipt of accommodations for RTL.<sup>12</sup> This review helped inform the 2017 Sport Concussion Assessment Tool, 5th edition (SCAT5), and Child SCAT5 tools, which include a graduated RTL strategy consisting of a step-wise approach for students with an SRC to transition back to class, assignments, and examinations following a period of cognitive rest.<sup>12,13</sup> Before 2017 national and international consensus and position statements provided only vague recommendations regarding RTL.<sup>11,14,15</sup> While an RTL strategy may be beneficial, the SCAT5 lacks clarification on strategy implementation.<sup>13</sup>

In 2012 an RTL strategy was developed and implemented by York Region District School Board educators following a physician-led educational workshop on SRCs.<sup>16,17</sup> Students who sustained SRCs used the Green Folder (GF) intervention, which contained detailed RTL steps, class-specific accommodation sheets, and a physician sign-off sheet.<sup>17</sup> A pilot survey of students who used the GF showed that 71.4% believed their concussion resolved faster as a result, suggesting that an RTL strategy may help facilitate the RTL process.<sup>18</sup>

The primary objective of this study was, therefore, to identify barriers to and facilitators of RTL following an SRC in students with and without the GF intervention. One of the studies identified by Purcell et al was conducted by Carson and colleagues and showed that 44.7% of students who sustained an SRC experienced symptom recurrence upon RTL, and that secondary school students specifically require the most rest days before returning to activity.<sup>19</sup> A second chart review of students by Carson et al found that symptoms recurred in 43.4% of female students compared with 29.7% of male students upon RTL.<sup>20</sup> In addition, a statistically significant difference in median time to return to play or learning was identified between female students (49 days) and male students (25 days).<sup>20</sup> Given these findings, gaining insight into RTL for female secondary school students

specifically was considered a next step. The secondary objective was to identify specific steps from illness to recovery that can be targeted to decrease time to RTL.

## — Methods —

This study received approval from the Scarborough Hospital Ethics Board. A grounded theory approach with in-depth qualitative interviews was used. Interview questions were created through consultation with experts in the field. (The interview guide is available from the corresponding author on request.) Female students were recruited by the lead investigator (P.W.) from a co-author's (J.D.C.'s) clinical practice. In each case, the SCAT3 tool had been used to augment the clinical diagnosis of SRC. Students were excluded if they did not sustain the concussion in 2015 or 2016, if they were not in secondary school at the time of the SRC, and if the concussion did not result from a sport-related activity. Informed consent was obtained and in-depth qualitative interviewing took place. As interviews were conducted, theoretical sampling and constant comparative analysis were performed until saturation was reached. Ultimately, 5 students who received a GF following an SRC and 5 students who did not receive any postconcussion intervention were included in the study. No matching was performed between the groups. The interviews were audiorecorded and transcribed. Two reviewers (N.K. and P.W.) independently analyzed the transcripts using NVivo software. The data were coded, and codes were grouped into overarching themes. Themes were validated through cross-checking with 3 students in the GF group and 2 in the non-GF group. The other 5 participants could not be reached or did not respond.

## — Findings —

A total of 10 female secondary school students with SRC from the York Region District School Board in Ontario were included. Demographic data and selected interview information are reported in **Tables 1** and **2**.

### Barriers

**Lack of graduated RTL process.** Upon initially returning to school, students in both groups reported ongoing concussion symptoms.

All students eventually returned to school; however, 2 of the non-GF students discontinued their studies until the following school year. The other 8 students mentioned that they could have benefited from more time away from full-time school and activities.

Like, you need to take steps or else you're going to regress, and I would say, yeah, going back into things slowly, like starting off school half days or a few periods until you can go full days and just the timing and that kind of stuff. (GF 4)

**Table 1. Student characteristics and selected information for those receiving the Green Folder intervention**

CHARACTERISTICS	GREEN FOLDER STUDENT 1	GREEN FOLDER STUDENT 2	GREEN FOLDER STUDENT 3	GREEN FOLDER STUDENT 4	GREEN FOLDER STUDENT 5
Grade at time of concussion	12	9	11	11	10
Age at time of concussion	17	14	16	16	14 or 15
School average before concussion	Low 90s	High 70s	High 80s	High 70s	Low 80s
Sport at time of concussion	Basketball	Rugby	Cheerleading	Soccer	Ringette
Loss of consciousness at time of concussion	No	No	No	No	No
Time before initial contact with a physician	2 d	Same day	Next day	Same day	Next day
Initial physician seen	Family doctor	Emergency doctor	Emergency doctor	Sports medicine doctor	Sports medicine doctor
Time until initial return to school	2 wk	3 wk	2 wk	3 wk	2 wk
Time until returning to school full time	4 mo	3 wk	1 mo	2 mo	1 mo
Time until returning to play	4 mo	Did not return	2 mo	4 mo	Did not return
Main contact person upon returning to school	Coach and guidance counselor	Guidance counselor	Guidance counselor	Sports medicine doctor and teachers	2 guidance counselors
Most influential person upon returning to school	Athletic therapist	Guidance counselor and doctor	Sports medicine doctor	Sports medicine doctor and teachers	2 guidance counselors and doctor
Accessed online information	No	No	No	No	Parachute Canada website; found it helpful
Time until feeling back to "normal"	Still not back to normal after 6 mo	4 mo	2 y	7.5 mo	Still not back to normal after 1.5 mo
Postsecondary school plans	Not applicable	University; nursing and creative writing	Queen's University in Kingston, Ont; general arts	University of California, Los Angeles; soccer scholarship	University

**Students' own stress.** All students reported concerns about maintaining their grades or failing upon RTL. However, all students reported looking forward to seeing their friends and getting back into "normal life." Students who put pressure on themselves to RTL too quickly experienced detrimental effects on their recovery.

Regarding advice they would give to other female secondary school students upon RTL following an SRC, common themes included resting, avoiding screen time, not rushing back into preconcussion routines, and not feeling guilty about taking time to recover.

I guess just the importance of not stressing and resting. I mean, I can't really speak for all girls, but I always need to get things done and there's always something on my mind, so it's just important to think of yourself before other priorities because that

was probably the thing that delayed my concussion [recovery] the most. Your head is so important, so you need to put that first, I think. (GF 1)

Don't ever let anyone make you feel bad for your processes taking longer than you thought it would and to be patient. (Non-GF 1)

Students were asked why they thought it takes female students almost twice as long as male students to recover from a concussion. Six students mentioned that girls are generally more stressed out and emotional than boys are, 1 non-GF student stated that boys are stronger than girls are, and 3 said they were unsure.

I think the stress about the concussion in general and the stress about getting back into a normal life kind

**Table 2. Student characteristics and selected information for those not receiving the Green Folder intervention**

CHARACTERISTICS	NON-GREEN FOLDER STUDENT 1	NON-GREEN FOLDER STUDENT 2	NON-GREEN FOLDER STUDENT 3	NON-GREEN FOLDER STUDENT 4	NON-GREEN FOLDER STUDENT 5
Grade at time of concussion	10	9	9	11	12
Age at time of concussion	16	15	15	17	16 or 17
School average before concussion	High 80s to low 90s	High 80s to low 90s	Mid 80s	Mid 80s	Mid 80s
Sport at time of concussion	Soccer	Basketball	Rugby	Skating	Trampoline
Loss of consciousness at time of concussion	No	No	No	No	No
Time before initial contact with a physician	Same day	2.5 wk	5 d	Same day	3 wk
Initial physician seen	Family doctor	Family doctor	Walk-in clinic physician	Emergency doctor	Sports medicine doctor
Time until initial return to school	1 wk	4 d	1 d	3 d	1 mo
Time until returning to school full time	4 mo	5 mo	4 mo	11 mo	1 mo
Time until returning to play	2.5 mo	7.5 mo	Did not return	4 mo	3.5 mo
Main contact person upon returning to school	Occupational therapist and doctor	Guidance counselor	Guidance counselor	2 guidance counselors	Guidance counselor
Most influential person upon returning to school	Occupational therapist and doctor	Guidance counselor	Guidance counselor	2 guidance counselors	Guidance counselor and doctor
Accessed online information	No	No	Parachute Canada website and Headspace mobile application: cannot remember if they were helpful	No	No
Time until feeling back to "normal"	1.5 y	9 mo	Still not back to normal after 5 mo	10 mo	5 mo
Postsecondary school plans	Ivy League university	University; business	University; athletic therapist or physiotherapist	University of Toronto in Ontario; architecture	University; engineering

of makes a concussion worse and just thinking about everything. I know me personally, as a girl, I think a lot about what happened or what I missed and that, so I think that that can definitely slow the process. (GF 3)

I feel like it's because there's so much on [girls'] minds to fit into society. Like, I know guys are pressured by social media as well, but I feel like girls are more pressured because there's a lot more female celebrities. Girls are pressured to look and act a certain way, and when you get a concussion you are basically thrown out of that and you have to get back into society and fitting in and stuff and that's really hard. And that's on our minds, like, "I have to go back, I have to pretend that I'm okay. I'm going to have to be the same as I was before even though I don't feel the same." (Non-GF 3)

**Lack of student education or awareness about concussions.** Five of the students (2 GF, 3 non-GF) mentioned the importance of becoming more educated about concussions and RTL.

I think if I knew more information about it then I wouldn't have exerted myself initially, that if I had known I had a concussion or known more about concussions I probably would have stayed in a dark room for the first week and not really pushed myself. (Non-GF 4)

I feel like in grade 9 gym ... that you should get a presentation in concussions so that they just understand what's going on, just so that if they get a concussion or their friends get a concussion or someone they know get[s] a concussion, just so that they know and

understand how to help them, understand what's going on and how to get them [to] get better or what they can do to get better. (Non-GF 3)

**Poor communication of expectations by educators.** All students reported that RTL would have been more successful had they received reassurance regarding accommodations and a decreased initial workload. This could have been achieved through increased communication among the student, teachers, guidance counselors, and physicians, or by having specific, individualized step-by-step guidelines.

I think letting people know that everybody's head is different and you are going to heal in different ways and that's okay. I think it would also be helpful to have tips on how to ease your way back into school, because I know for me it was very stressful because I didn't have a guideline; it was just like, okay, I have to get caught up now. So I think that having more of a step-by-step or guideline for easier transition back into school, that would be helpful. (GF 3)

And assignments, maybe teachers could make a plan with you instead of telling you a specific deadline and just be able to communicate with the teachers more freely so they can accommodate with what days you feel like you are able to finish it by. (GF 5)

If [teachers] reassured me that it was going to be okay and I really didn't have to do anything, then I think initially I would have been less stressed and probably wouldn't have pushed myself, which probably made me worse .... Maybe if they had meetings with me and my teacher I would feel more comfortable about that because I felt like the guidance department was talking to the teachers and the teachers were talking to me, but we never really talked all together, so maybe that would be helpful. (Non-GF 4)

**Inadequate support from teachers and lack of teacher education on concussions.** The need for improved teacher education and understanding regarding concussions became a recurring theme in both groups. While all students believed their guidance counselors were supportive upon RTL, only 7 students felt the same about their teachers. Three non-GF students described their teachers as not being supportive owing to poor communication between teachers and the administration.

I had a teacher that didn't really understand my concussion, and she made me do assignments that I don't think I was ready to do, which would make my mark go down, too, so I don't know. Some teachers don't understand and I feel like they should be more educated on how to treat people or students with concussions. (GF 5)

Like, the administration fully understands everything and, like, it doesn't entirely filter down to the teachers, which is sometimes really difficult .... Your teacher doesn't understand that you will have bad days and you may not be able to come to school because your bad days are hard. (Non-GF 3)

## Facilitators

**Provision of academic accommodations.** Of the 8 students who returned to their current academic year, all received homework and assignment accommodations, and 7 reported either not writing examinations or receiving accommodations. Three students (1 GF, 2 non-GF) maintained their grades, 4 students (3 GF, 1 non-GF) reported that their grades were either maintained or increased, and 3 students (1 GF, 2 non-GF) reported that their grades suffered following their concussion.

Of the 4 students who discussed having used the GF, 1 student reported it was helpful, while the other 3 reported that either the GF was not entirely helpful or was not successfully implemented.

**Presence of a primary contact person.** All students reported that their guidance counselors were supportive, with 7 students naming the guidance counselor as their main point of contact. Of these 7 students, 6 reported that their guidance counselor was also the most influential person upon returning to school.

He facilitated things with the teachers, so he gave the teachers the accommodations that I needed from those reports that the doctor filled out. So he was the go-to, I guess, with the teachers and also the vice-principal, he brought the vice-principal into it. So he was a very good liaison that way as well. And very understanding and empathetic. (Non-GF 3)

## — Discussion —

This study identifies barriers to and facilitators of RTL following an SRC as reported by female secondary students through in-depth qualitative interviewing. Barriers to RTL include an inadequate recovery period and a lack of graduated RTL. This supports existing research suggesting a period of rest before RTL and the need for academic accommodations upon RTL.<sup>11,12</sup> An interesting finding is the students' feeling of stress, and the belief that this may contribute to the longer recovery in female compared with male students. Other identified barriers also align with findings of previous research in the field, including insufficient concussion education among students and educators and a lack of communication among stakeholders. Purcell et al identified several surveys of other stakeholders who also suggested the need for more effective communication.<sup>12,21-23</sup>

Although the pilot survey identified the GF as a facilitator of recovery,<sup>18</sup> this study found that regardless of

the GF intervention, all students felt accommodated, most were able to maintain or improve their grades, and the length of time until feeling back to “normal” was similarly varied. Additionally, 2 GF students reported that it was not fully implemented or used. Thus, the true impact of the GF intervention on improving RTL is unclear. To ensure that an RTL strategy continues to facilitate RTL it is necessary to overcome barriers to appropriate implementation at each stakeholder level.

One novel facilitator of RTL identified by this study was the presence of a primary contact person within the school system. In most cases, the primary contact person was identified as the most influential in assisting with RTL, and for most, this was the school guidance counselor.

The secondary objective of this study was to identify critical junctures on the injury-to-recovery continuum that can be targeted to enhance RTL. One possibility is an initial school meeting after SRC, where academic expectations and accommodations can be discussed before RTL. This should occur with a primary contact person who is knowledgeable regarding SRCs and RTL and who will effectively act as a liaison between the physician, student, and teachers. This meeting would help to ameliorate some of the barriers identified in this study: it may reduce students' stress and help to confirm, with physician input, that the student is ready to RTL. This leader could also bridge the communication gap between student and teachers, and teachers and physician, and ensure appropriate accommodations are being made. Improved communication between teachers and other stakeholders could enhance teacher knowledge. Further research might include a survey or qualitative interviewing of guidance counselors to determine how to optimize their role.

While not all results of this study are novel, they are confirmatory of previously published outcomes in concussion research and lend support to those findings. Certainly, greater insight into barriers and facilitators for female secondary school students' RTL is necessary. Following this study, a qualitative study of various stakeholders was conducted to further explore GF buy-in, and this led to the Holland Bloorview Kids Rehabilitation Hospital Foundation publication of the SCHOOLFirst concussion resource.<sup>23,24</sup> For now, physicians, educators, and students should consider the aforementioned barriers and facilitators, and leverage the SCHOOLFirst resource to optimize RTL.<sup>23-25</sup>

## Limitations

There are several limitations to this study, including the potential for interviewer, transcriber, and coding bias. Selection bias also occurred in the form of voluntary response and nonresponse bias. The validity and reliability of these findings are also unknown and require further assessment. As the GF intervention was inconsistently implemented, its role as a facilitator also remains unknown.

## Conclusion

Results of this study support existing findings in the realm of concussion research. Graduated RTL with academic accommodations, reassurance regarding these accommodations, enhanced education among teachers and students, and clearer communication between stakeholders should be implemented to improve outcomes. A novel finding includes the importance of a primary contact person as a facilitator of RTL. An initial school meeting after SRC and before RTL with a primary contact person would potentially help to overcome identified barriers to RTL. Physicians, educators, and students should consider the findings of this study to optimize RTL, but also recognize the study's limitations and the need for further research.

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### Contributors

**Drs Wildgoose** and **Carson** contributed to the concept and design of the study, and to data gathering. All authors contributed to data analysis and interpretation, and preparing the manuscript for submission.

### Competing interests

None declared

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Artist: Dr Julia Gibson, child and adolescent psychiatrist, Vancouver, BC. *Going to be somebody*