

AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS OF UNIVERSITY  
ATHLETES' EXPERIENCES WITH PROTRACTED CONCUSSION SYMPTOMS

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## Abstract

Researchers have estimated that 1.6 to 3.8 million concussions occur each year (Langlois, Rutland-Brown, & Wald, 2006), with the majority of them occurring in sport (Marshall et al., 2015). While most concussions resolve within 7 to 10 days, 10 to 20% of athletes experience protracted concussion symptoms that often include both physical and psychological symptoms that can persist from weeks to months to years (Caron, Bloom, Johnston, & Sabiston, 2013; McCrory et al., 2013). Presently, few studies have specifically focused on the experiences of athletes suffering from protracted concussion symptoms. As such, the purpose of this study was to better understand the experiences of Canadian University female athletes who suffered from protracted concussion symptoms. Five Canadian female University athletes participated in face-to-face individual interviews. An Interpretative Phenomenological Analysis (Smith, Flowers, & Larkin, 2009) was used to inductively analyze the interview data. The results revealed that in addition to suffering physically from their concussions, all five participants suffered emotionally immediately following their concussion, as well as throughout their rehabilitation. Their injury responses included descriptions of frustration, irritability, mood swings, weight issues, and depression. Such responses might have been related to the unique factors athletes associated to concussion recovery including isolation from their team, lack of return date and the non-physical rehabilitation program, as well as the lack of knowledge concerning concussions. Furthermore, athletes' prolonged concussion recovery led to several academic repercussions, such as reduced class attendance, difficulty studying, and poor grades. These academic repercussions negatively impacted their academic path, as some of the athletes were forced to take an extra semester or were dismissed from their respective study programs. Finally, results disclosed that social support was a crucial element of the athletes' recovery. Participants network of social support included family members, coaches, health professionals, and teammates. Athletes' preferences for social support were daily check-ins from coaches and teammates, as well as receiving informational support about concussions from medical personnel. Moreover, athletes felt some forms of social support were ineffective, including being asked by teammates about their expected return to play date or being told by teammates that they did not look well. In sum, this study provides one of the first empirical accounts of the effects of experiencing protracted concussion in a university setting. Given that coaches, medical professionals, and sport and exercise psychology professionals regularly interact with injured athletes, the present results may provide them with information that can enhance their applied work with this population.

## Résumé

Les chercheurs ont estimé qu'il y a 1,6 à 3,8 millions de commotions cérébrales qui se produisent chaque année (Langlois, Rutland-Brown, & Wald, 2006), dont la majorité d'entre elles se produisent dans le sport (Marshall et al., 2015). Alors que la plupart des commotions cérébrales se résout entre 7 à 10 jours, 10 à 20% des athlètes souffrent de symptômes prolongés qui comprennent souvent des symptômes physiques et psychologiques qui peuvent persister de quelques semaines à plusieurs mois ou années (Caron, Bloom, Johnston, & Sabiston, 2013; McCrory et al., 2013). À l'heure actuelle, peu d'études ont porté spécifiquement sur les expériences des athlètes souffrant de symptômes d'une commotion cérébrale prolongée. De ce fait, le but de cette étude était de mieux comprendre les expériences d'athlètes féminines canadiennes universitaires qui ont souffert de symptômes de commotion cérébrale prolongée. Cinq athlètes féminines canadiennes universitaires ont participé à un entretien face-à-face individuel. Une « Interpretative Phenomenological Analysis » (Smith, fleurs, et Larkin, 2009) a été utilisée pour analyser les données inductives provenant des entretiens individuels. Les résultats ont révélé qu'en plus de souffrir physiquement de leurs commotions cérébrales, les cinq participantes ont souffert émotionnellement immédiatement après leur commotion cérébrale, ainsi que tout au long de leur réadaptation. Leurs réponses comportementales comprenaient des descriptions de frustration, d'irritabilité, des sauts d'humeur, des problèmes de poids ainsi que des symptômes de dépression. Ces réponses peuvent avoir été liées aux facteurs uniques associés à la réhabilitation des commotions cérébrales que les athlètes ont souligné, y compris d'être isolé de leur équipe, le manque de date de retour, le programme de réhabilitation non-physique et le manque de connaissances sur les commotions cérébrales. En outre, la réhabilitation prolongée des athlètes a conduit à plusieurs répercussions académiques, telles qu'une présence en classe réduite, des difficultés liées à l'étude ainsi que des mauvais résultats scolaires. Ces répercussions académiques ont eu des effets négatifs sur leur parcours académique, puisque certains des athlètes ont été forcés de prendre un semestre supplémentaire ou ont été renvoyées de leurs programmes d'études respectifs. Enfin, les résultats ont révélé que le soutien social est un élément crucial durant la réhabilitation des athlètes. Le réseau de soutien social des participantes comprenait des membres de la famille, des entraîneurs, des professionnels de la santé, et leurs coéquipières. Les méthodes de soutien social préférées des athlètes étaient les « check-in » quotidiens de la part des entraîneurs et de leurs coéquipières ainsi que de recevoir un soutien informationnel sur les commotions cérébrales provenant du personnel médical. De plus, les athlètes ont souligné certaines méthodes de soutien social qui étaient inefficaces, tels que se faire poser des questions par ses coéquipières au sujet de leur date de retour au jeu ou de se faire dire par ses coéquipières qu'elles ne semblent pas bien. En somme, cette étude fournit l'un des premiers comptes empiriques sur les effets de symptômes de commotion cérébrale prolongés dans un cadre universitaire. Étant donné que les entraîneurs, les professionnels de la santé et les professionnels de psychologie du sport et de l'exercice interagissent régulièrement avec les athlètes blessés, les résultats actuels peuvent leur fournir des renseignements afin d'améliorer leur travail pratique avec cette population.

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## **Chapter 1**

### **Introduction**

Sport-related concussions have recently become a public health issue and have received a great deal of attention both inside and outside of the academic domain (Covassin, Elbin, Crutcher, & Buckhart, 2012; Wiebe, Comstock, & Nance, 2011). In Canada, several high profile incidents in professional hockey (i.e., those involving superstars Sidney Crosby, Eric Lindros) and the lawsuit against the National Hockey League (NHL) by 60 former players have brought the issue to light. More precisely, in November 2013, 60 former NHL players filed a lawsuit claiming that the league concealed evidence and did not warn players on the dangers they faced with concussions and brain injuries (Hille, 2015). Although concern over concussions and player safety is mounting in professional sports, the issue has also come to life in Canadian University sport. For example, a former Bishop Gaiters football player named Kevin Kwasny is suing his former coaching staff for making him play during a Canadian Interuniversity Sport (CIS) game while experiencing concussion symptoms, which he said caused bleeding on his brain and left him in critical condition (Lambert, 2015). Two years following his accident and extensive medical costs, Kwasny was still living in a rehabilitation centre and was trying to regain his mobility and strength (Lambert, 2015). In light of the health and financial issues surrounding player safety and rehabilitation, the sporting community must be aware of the factors affecting athletes who are suffering from concussions symptoms.

Researchers have estimated that 1.6 to 3.8 million concussions occur each year (Langlois, Rutland-Brown, & Wald, 2006), with the majority of them occurring in sport (McCrory et al., 2013). According to various experts, concussions are a complex pathophysiological process affecting the brain, induced by biomechanical forces such as a direct blow to the head, face, neck

or elsewhere on the body (McCrory et al., 2013). The most commonly reported post-concussion physical symptoms are headaches, dizziness, fatigue, and sensitivity to light and sound (McCrory et al., 2013). Additionally, athletes suffering from a concussion may also experience psychological symptoms such as depression, isolation, and anxiety (Guskiewicz & McLeod, 2011; Ptito, Chen, & Johnston, 2008). The majority of concussions are healed in a short (7-10 day) period. A smaller percentage of athletes (i.e., 10% to 20%) experience protracted concussion symptoms that often include both physical and psychological symptoms that can last for days, weeks, or in some cases, persist from months to years (Caron, Bloom, Johnston, & Sabiston, 2013; Guskiewicz et al., 2011). Not surprisingly, experiencing these symptoms for a prolonged amount of time can negatively affect the quality of life of both athletes and their loved ones (e.g., Caron et al., 2013; Gavett, Stern, & McKee, 2011; McKee et al., 2013).

Although athletes of all ages and levels are susceptible to head injuries, collegiate athletes have experienced a high rate of diagnosed concussions (Gessel, Fields, Collins, Dick, & Comstock, 2007; Kroshus, Kubzansky, Goldman, & Austin, 2014). Research on this unique population has found specific factors linked to concussion recovery, such as concussion reporting, their emotional state, and gender differences. With respect to concussion reporting, research has shown that the number of concussions sustained by collegiate athletes was likely higher than the number of concussions reported to coaches or medical personnel by these athletes (Delaney, Lamfookon, Bloom, Al-Kashmiri, & Correa, 2015; Kroshus et al., 2014). In terms of emotional sequelae, findings have shown that post-concussion symptoms aggravated emotional responses to injury, such as depression, confusion, fatigue, anger, irritability, and anxiety (Vargas, Rabinowitz, Meyer, & Arnett, 2015; Yang, Peek-Asa, Covassin, & Torner, 2015). Finally, gender differences have revealed that female collegiate athletes may be more

forthcoming in reporting concussion symptoms and may experience a greater number of physical and psychological symptoms than male collegiate athletes (Covassin, Elbin, Harris, Parker & Kontos, 2012; Dick, 2009). Taken together, an in-depth understanding of female athletes' experiences with protracted concussion symptoms is needed.

According to the integrated model of sport injury and rehabilitation (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998), an athlete's recovery from injury is dependent upon both personal (i.e., gender and age) and situational factors (i.e., social support and level of competition) and how they interact with each other. In turn, these factors influence athletes' cognitive appraisal of a sport-related injury, which leads to emotional and behavioural responses that ultimately impacts the physical and psychological recovery outcomes. This integrated model is a widely recognized framework used to explain the complex sport-injury process and could help to gain insight into the lived experiences of female athletes protracted concussion symptoms.

As highlighted by the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998), social support is both a situational variable and a coping resource for an injured athlete. To date, a large amount of research on athletic injury has highlighted the value and impact of social support during the rehabilitation period (e.g., Bianco, 2001; Yang, Peek-Esa, Lowe, Heiden, & Foster, 2010). Social support is a multidimensional construct (Bianco & Eklund, 2001) that includes emotional, informational, and technical support (Brewer, 2006). Athletes have reported friends and family members often provided emotional support (Bianco, 2001; Udry, Gould, Bridges, & Tuffey, 1997), and medical personnel and coaches frequently provided informational and technical support (Bianco, 2001; Yang et al., 2010). Specific to concussion rehabilitation, spouses provided emotional support (Caron et al., 2013) and coaches offered

informational support (Baugh, Kroshus, Daneshvar, & Stern, 2015). In spite of these results, research has yet to look at the provision of social support during collegiate athletes' protracted concussion symptoms recovery. Given the particular context of collegiate athletics and the unique characteristics of concussion recovery, an in-depth understanding of female athletes' experiences with protracted concussion symptoms and the social support needs during rehabilitation is needed.

The majority of what is known about protracted concussion symptoms has been acquired through the use of quantitative research methods such as questionnaires (e.g., White et al., 2014), self-reported symptom checklists (e.g., McLeod & Leach, 2012), and medical scans (e.g., O'Neil, Nauheim, & DeLorenzo, 2014; Ptito et al., 2008). These methods of data collection have not provided athletes with an opportunity to share their own thoughts and feelings about their experiences during their prolonged rehabilitation. On the other hand, interviewing, a rigorous and approved source of qualitative data collection (Moustakas, 1994; Rubin & Rubin, 2012), has allowed participants to share personal opinions, experiences, feelings, and attitudes about a social phenomenon without limitations (Sparkes & Smith, 2014). As a result, the current study used in depth-interviews through a qualitative approach known as phenomenology (Creswell, 2013; Sparkes & Smith, 2014). More specifically, the current study implemented Interpretative Phenomenological Analysis (IPA), whose primary objective is to explore and describe participants' perceptions of an experience (Smith, Flowers, & Larkin, 2009). IPA also emphasizes the dynamic interpretative process, in which participants try to make sense of their experiences and the primary researcher tries to make sense of the participants' experiences through her similar experiences (Smith et al., 2009).

### **Purpose of the Study**

The objective of the current study was to understand the experiences of CIS female athletes who have suffered protracted concussion symptoms. The study attempted to answer the following questions:

1. How are CIS female athletes affected psychologically/emotionally by protracted concussion symptoms?
2. How do protracted concussion symptoms affect the academic experiences of CIS female athletes?
3. In what ways do CIS female athletes perceive to get support during their concussion recovery?
4. What type and source of social support do female university athletes prefer during concussion recovery?

### **Significance of the Study**

While research has begun to investigate psychological aspects of concussions, few studies have specifically focused on the experiences of athletes suffering from protracted concussion symptoms. Therefore, the findings of this study provide a better understanding of the effects of prolonged concussion symptoms on the quality of life of student-athletes. For example, the ways in which this long-term brain injury affects the athletic development, academic progression, and interactions with those closest to these collegiate athletes. Monitoring emotional disturbances and academic concerns of athletes with protracted concussion symptoms can potentially prevent emotional deterioration and facilitate recovery. In addition, the current findings also specify the athlete's social network and how they affect their recovery. Finally, sport psychology researchers have recommended that research is needed to specifically examine the experiences of injured

female athletes because they may differ from those of males (Wadey, Evans, Evans, & Mitchell, 2011). Therefore, results from this phenomenological study allow for unique insight to female athletes who have suffered a concussion by providing one of the first accounts of female athletes' experiences with protracted concussion symptoms.

### **Delimitations**

The following delimitations have been identified for the current study:

1. Participants will be Canadian Interuniversity Sport female athletes who were on the roster of an interactive sport team.
2. Participants will have had the same head coach from the time they suffered their concussion until they made their return to play.
3. Participants will have suffered a medically-diagnosed concussion that resulted in protracted concussion symptoms for a minimum of 8 weeks during their CIS career.
4. Participants will no longer be suffering from protracted concussion symptoms and will have received medical clearance and have returned to play at the time of the interview.

### **Limitations**

The following limitations were identified for the current study:

1. Results of this study may only be applicable in the context of university sport.
2. Results of this study may only be applicable to CIS female athletes.
3. Results of this study may only be relevant to CIS coaches who coach female athletes.
4. Results of this study are only representative of the athlete's perceptions of protracted concussion symptoms recovery.
5. Results may be limited by the athletes' recall ability.

### **Operational Definitions**

The following operational definitions were used in this study:

*Concussion:* The Concussion in Sport (CIS) group defined concussion as “a complex pathological process affecting the brain induced by traumatic biomechanical forces” (McCrory et al., 2013). Furthermore, the diagnosis of a concussion involves a range of five domains: (a) symptoms – somatic (e.g., headache), cognitive (e.g., feeling like in a fog) and/or emotional symptoms (e.g., lability), (b) physical signs (e.g., loss of consciousness, amnesia), (c) behavioural changes (e.g., irritability), (d) cognitive impairments (e.g., slowed reaction times), (e) sleep disturbance (e.g., drowsiness) (McCrory et al., 2013).

*Protracted concussion symptoms:* In 10 to 20% of individuals, concussion symptoms may persist for a longer period of time than usual (i.e., > 2 weeks), which can result in athletes incurring both physical *and* psychological symptoms that can last days to weeks or persist from months to years (Caron et al., 2013; Guskiewicz et al., 2011).

*CIS:* Canadian Interuniversity Sport association is the national governing body of university sports in Canada, comprising the majority of degree granting universities in the country. There are currently 55 member universities in the CIS for a total of 11,000 student-athletes and 700 coaches (Canadian Interuniversity Sport, 2012).

## **Chapter 2**

### **Literature Review**

This chapter consists of four main sections. First, concussions will be discussed, focusing primarily on the history of concussion research. Furthermore, this section will explore the contributions of the International Conference on Concussion in Sport. Second, concussion research related to collegiate athletes will be explored. Third, the integrated Model of the Response to Sport Injury and Rehabilitation (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998) will be explained. Finally, social support will be explored with a particular emphasis on the effect of social support provision on athletic injury rehabilitation.

#### **Concussions**

According to Yang, Peek-Asa, Lowe, Heiden, and Foster (2010), athletic injuries can negatively affect both the physical (e.g., lack of mobility and fatigue) and mental health of athletes (e.g., depression, anxiety, and lower self-esteem). As a result, an increase in empirical research concerning injury management and athletes' psychosocial experiences during injury rehabilitation has taken place in the past fifteen years (e.g., Bianco, 2001; Podlog & Eklund, 2007; Podlog, Dimmock, & Miller, 2011). Specifically, concussions have received greater attention in the last decade and are now more commonly recognized as a serious injury among athletes in a variety of sports (Johnson, Partridge, & Gilbert, 2015). A growing body of scientific evidence has identified a combination of neurological, cognitive, and behavioural consequences of athletes who have sustained a concussion (Kroshus, Baugh, Hawrilenko, & Daneshvar, 2015; Kroshus, Kubzansky, Goldman, & Austin, 2014). These consequences have raised the awareness of the emerging public health-concerns surrounding this brain injury in sport and recreational activities (Dick, 2009).

Researchers have estimated that 1.6 to 3.8 million concussions occur each year in the United States (Langlois, Rutland-Brown, & Wald, 2006), with the majority reported in contact and collision sports at the high school and college levels (Daneshvar, Nowinski, McKee, & Cantu, 2011; McCrory et al, 2013). However, the actual number of sport-related concussion is likely higher, as the preceding numbers reflect only concussive injuries that were reported to medical personnel (Covassin, Elbin, Harris, Parker, & Kontos, 2012). In fact, concussions are invisible (i.e., no swelling, stitches) (Bloom, Horton, McCrory, & Johnston, 2004), therefore some concussions are not recognized, diagnosed, and treated (Bailes, 2009; Delaney, Lamfookon, Bloom, Al-Kashmiri, & Correa, 2015; McCrory et al., 2013; Meehan & Bachur, 2009). The epidemiology of concussions in athletics is a major problem for coaches, sport practitioners, family members, and peers concerned about athletes' mental and physical health, which brings the need to better understand concussive injuries as well as the appropriate injury management.

**History of concussion research.** Although research has intensified in the last decade, the effects of head trauma in sports were first reported over a century ago (Johnson et al., 2015). Concussion research emerged in the twentieth century, with roots originating from the early sixteenth century. Stemming from its Latin roots, the term *commotio cerebri*, meaning “to shake violently”, was first used by the anatomist Berengario Da Carpi (Denny-Brown & Russell, 1941). The famous Italian physician used the word when describing effects of injuries to the brain without a skull fracture (Denny-Brown & Russell, 1941). Although the origin of the word dates over centuries ago, the term concussion did not appear in the medical literature until the early 1900s (Martland, 1928; Nichols & Smith, 1906).

Nichols and Smith (1906) were the first to discuss the unknown consequences of American football players' injuries. These injuries included "concussions of the brain" and were mentioned in an editorial commentary of the *Boston Medical and Surgical Journal* (Nichols & Smith, 1906, p. 3). The authors reported their personal experiences in the care of Harvard University football players during the 1905 season by illustrating general treatment methods for common football injuries (Nichols & Smith, 1906). Nichols and Smith voiced their concern in regard to brain injuries in American football. Possible reasons for the authors' concern surrounding brain injuries ranged from concussions of the brain being the most severe injury reported by the players, to the probable long-term consequences associated with this brain injury (Nichols & Smith, 1906). Several years after Nichols and Smith's editorial commentary, Dr. Harrison Martland reported a condition that referred to boxers as *punch drunk*, where spectators popularly described these athletes as "cuckoo", "goofy", or "slug-nutty" (Martland, 1928, p. 1103). The afflicted pugilists, known to receive repeated blows to the head, were suffering a range of neurological symptoms, including confusion and characteristics of Parkinson's disease (Martland, 1928). Although the "Punch Drunk" condition was only supported by observations, this was the first instance of concussions reported in the sporting literature as a type of brain injury (Martland, 1928). Martland's report (1928) drew the attention of medical professionals, such as neuropathologists, guiding them to further examine concussive injuries as this condition could no longer be ignored. Consequently, research efforts following Martland's report were committed to detailed experimental studies of concussion on animals (e.g., cats and macaques rhesus monkeys) (Denny-Brown & Russell, 1941; Walker et al., 1944; Williams & Denny-Brown, 1941). Despite an increase in experimental concussion research in the medical literature, experimental research studying human participants had yet to emerge in the mid 1900s.

In the 1970s, the term concussion first appeared in the medical literature (Beaussart & Beaussart-Boulengé, 1970; Gronwall & Wrightson, 1975) with experimental studies done on amateur boxers and young male adults who had suffered multiple concussions. Beaussart and Beaussart-Boulengé clinically examined 123 amateur boxers and ran electroencephalograms before and after each boxer's fight. The results from this study showed the negative impact of repetitive head injuries on short- and long-term neurologic (cognitive) performance. Gronwall and Wrightson (1975) conducted a controlled prospective study on men between the ages of 17 and 48 who suffered from a second minor head injury in comparison to a controlled group with participants who only suffered one concussion. More specifically, the study focused on the length of time taken off work and the concussion's effects on leisure activities. Results showed a high incidence of symptoms when participants returned to work and a negative impact on leisure activities. Also, within the experimental group, twenty percent of the participants still had concussion symptoms ninety days after their accident. Since the experimental group took longer to recover than the control group, Gronwall and Wrightson speculated that the effects of concussion were cumulative. The findings from these two initial experimental studies had important implications for researchers and sport administrators as they stressed the importance of creating an effective program for the management of minor head injuries due to their negative health repercussions.

In the 1990s, sport-related concussion continued to receive significant attention in the field of sports medicine. Researchers were determined to find answers in regard to the incidence and severity of concussion in contact sports (Gerberich, Priest, Boen, Straub, & Maxwell, 1983), the frequency of concussions in contact sports (Tegner & Lorentzon, 1996), the second-impact syndrome in contact sports (Saunders & Harbaugh, 1984), the diagnosis of concussions

(Maddocks, Dicker, & Saling, 1995; Mueller, 1998), and the relationship between concussion and neuropsychological performance (Collins, Grindel, Lovell, et al., 1999). However, such a rapid increase in empirical studies brought forward many issues. The lack of a shared understanding of concussive injuries (i.e., consensus definition, concussion management and safety) made it difficult to create practical guidelines for medical practitioners and coaches working with athletes at risk for sport-related concussions and to draw conclusions from past research findings.

**International conferences on concussion in sport.** Approaching the new millennium, concussion in sports received greater attention as more was understood about the short- and long-term health and performance consequences of this injury (Dick, 2009). This research growth established a need for leading experts to review the concussion literature and return to play guidelines. As a result, a meeting known as the International Conference on Concussion in Sport (ICIS) was organised in Vienna, Austria in 2001 by the International Ice Hockey Federation (IIHF), in partnership with the Fédération Internationale de Football Association, and the International Olympic Committee Medical Commission (IOC). Four years later, the same governing bodies, with the addition of the International Rugby Board (IRB), organized the 2nd International Conference on Concussion in Sport in Prague (Aubry et al., 2006). The original aims of the symposia were to provide guidelines “for the improvement of safety and health of athletes who suffer concussive injuries in sports” (Aubry et al., 2002, p. 6). During the conference, researchers, experts, and practitioners were invited to address issues of epidemiology, cognitive assessment, new research methods and prevention, and long-term outcomes (Aubry et al, 2002). In addition, it was also their mandate to revisit the existing definition of concussions. At the conclusion of the 2001 and 2004 conferences, a small group of

experts, known as the Concussion in Sport Group (CISG), drafted a document describing the agreement position reached by those who attended the conference for use by doctors, therapists, health professionals, coaches, and other people involved in the care of injured athletes (Aubry et al., 2002). Due to the significant recommendations and progress that resulted from the first two International Conferences, two more symposia were organized.

The third and fourth International Conferences on Concussion in Sport were held in Zurich in 2008 and 2012 and were slightly different than the original symposia (McCrory et al., 2009). These conferences followed the consensus meeting guidelines set by the US National Institutes of Health (NIH) (McCrory et al., 2009; NIH Consensus Development Program, 2013). Such guidelines included “a broad-based, non-governmental, non-advocacy panel to give balanced, objective and knowledgeable attention to the topic of concussion in sport” (McCrory et al., p. 42). Moreover, NIH format requires that experts present to a panel consisting of 12-16 members, as well as the general public (NIH Consensus Development Program, 2013). Hence, during the 2008 and 2012 meetings, experts chosen for the panel ranged from researchers in clinical medicine, sports medicine, neuroscience, neuroimaging, athletic training, and sports science (McCrory et al., 2009). These designated members addressed conference questions in a public setting with the use of a systematic review of the literature on concussion in sport (McCrory et al., 2009). Following the public address, experts met in an exclusive session to prepare the consensus statement. The purpose of the consensus statement was “to serve as a scientific tool to widely disseminate the knowledge in order to achieve maximum impact on both current health care practice and future medical research” (McCrory et al., p. 42). The next meeting is scheduled in 2016.

Since the first meeting in 2001, significant progress and changes in concussion research and treatment have taken place. The 2012 consensus statement outlined the latest development in concussion research and management. This included a revised and accepted consensus definition of concussion, a standardized tool for physician assessments of sport-related concussions and patient education, advanced concussion management, as well as a return to play concussion protocol. These specific advances in concussion research and management will be individually explained as described by the latest consensus statement (McCrory et al., 2013).

One of the primary outcomes of the International Conferences on Concussion in Sport was the development of the current consensus definition of a concussion. Beginning in November 2001, the “consensus” definition of concussion proposed over 45 years ago by the committee on head injury nomenclature of the Congress of Neurological Surgeons (1966) was rewritten because it did not take in to account the common symptoms of concussion and omitted minor head impact injuries (Aubry et al., 2002). In 2013, the CISG defined a concussion as “a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces such as a direct blow to the head, face, neck or elsewhere on the body” (McCrory et al., 2013, p. 250) resulting in the rapid onset of symptoms and cognitive impairments (McCrory et al., 2013). Along with this definition, the CISG highlighted four essential constructs to define the nature of the injury (see Appendix A) (McCrory et al., 2013). Along with these revised constructs, the CISG also modified the list of physical signs and symptoms associated with the definition of concussions. The diagnosis of a concussive injury usually involves the assessment of several categories including clinical symptoms (e.g., headache, feeling like in a fog, lability), physical signs (e.g., loss of consciousness, amnesia), cognitive impairment (e.g. slowed reaction times), neurobehavioural features (e.g., irritability), and sleep disturbances (e.g., insomnia)

(McCrory et al., 2013). According to the CISG, if any of these five components are present, a concussion should be suspected and the athlete must be removed from play and medically assessed (McCrory et al., 2013).

Significant progress was also made by the CISG with the development of the sport concussion assessment tool (SCAT3) (McCrory et al., 20013). The SCAT3 was created by combining several existing tools into a new standardized tool, and should be used strictly for athletes aged 13 years and older (McCrory et al., 2013). Medical professionals should administer the SCAT3 once an athlete is suspected of suffering a concussion. When completing the SCAT3 card, an athlete must self-score the symptoms. A comprehensive score is given by multiplying each current symptom the patient is experiencing (e.g. headaches) by the severity of each symptom (0= none, 6= severe), giving an overall score of 132 (McCrory et al., 2013).

Subsequently, while assessing the athlete, the physician must take note of the physical signs and compute the athlete's composite score. This score is comprised of the athlete's balance assessment score as well as the athlete's cognitive and physical evaluation score (McCrory et al., 2013). The diagnosis of a concussion is a clinical judgement based on the athlete's SCAT3 composite score, physical signs, and abnormal behaviour (McCrory et al., 2013). If a concussion is suspected, proper concussion management must be followed before returning to play (McCrory et al., 2013).

Another outcome resulting from the recent Concussion in Sport symposium was the advancement in concussion management. Usually, the majority of concussions (80-90%) are resolved in a short (7-10 days) period following complete cognitive and physical rest. However, the 2012 panel of experts clarified that, in some cases, clinical and cognitive symptoms may be prolonged (McCrory et al., 2013). In fact, a smaller percentage of athletes (i.e., 10% to 20%)

experience protracted concussion symptoms that often included both physical and psychological symptoms that can last for days, weeks, or in some cases, persist from months to years (Caron, Bloom, Johnston, & Sabiston, 2013; Guskiewicz & McLeod, 2011; McCrory et al., 2013). Due to the lack of scientific research regarding concussion rehabilitation, further research is needed to judge the appropriate amount and type of rest needed during protracted concussion symptom recovery (McCrory et al., 2013).

In addition to identifying factors that influence concussion management, the CISG developed a graduated structure and supervised concussion protocol for ideal recovery and successful return to play once an athlete has received medical clearance (McCrory et al., 2013). The Graduated Return to Play Protocol states that the athlete must be completely asymptomatic before the start of the rehabilitation program and must follow the stepwise process with gradual increments in exercise duration and intensity (McCrory et al., 2013). The athlete can proceed to the next level once he/she is asymptomatic at the current level (McCrory et al., 2013). The patient must drop back to the previous asymptomatic level and rest for a 24 hour period before attempting the same level again, if the athlete experiences post-concussion symptoms during one of the steps (McCrory et al., 2013). Therefore, an athlete must successfully complete the Graduated Return to Play Protocol before returning to competition (McCrory et al., 2013).

### **Concussions and Collegiate Athletes**

Although athletes of all ages are susceptible to concussions, college athletes are a particularly vulnerable population due to their participation in activities with a high risk of brain trauma (Kroshus et al., 2014). In the 2011-2012 academic year alone, 450,000 student-athletes competed in university sport within the National Collegiate Athletic Association (NCAA), and approximately 10,000 student-athletes competed in the Canadian Interuniversity Sport

association (CIS, 2012; U.S. Department of Health and Human Services, 2011-2012).

Epidemiological evidence shows that collegiate athletes have high rates of concussions (Gessel, Fields, Collins, Dick, & Comstock, 2007). More specifically, concussion incidence was found to be the highest in sports of football and soccer among both female and male collegiate athletes (Gessel et al., 2007). This concerning incidence of concussions in collegiate athletes has driven extensive research efforts in the last five years towards this particular population (Baugh, Kroshus, Daneshvar, & Stern, 2014; Covassin et al., 2014; Kroshus, Baugh, Hawrilenko, & Daneshvar, 2015; Kroshus, Kubzansky, Goldman, & Austin, 2014; Mainwairing et al., 2010). The following section will highlight issues of concussion reporting, emotional sequelae, and gender differences discussed in concussion research related to collegiate athletes.

**Concussion reporting.** The current diagnosis of a concussion is dependent upon an athlete's self-report of symptoms (Baugh et al., 2014). Since there is no loss of consciousness and no obvious external signs in the majority of sport-related concussions, coaches and medical personnel are dependent on athletes self-reporting their symptoms for diagnosis (Delaney et al., 2015). Unfortunately, in collegiate sports, timely identification and removal from play does not always take place, as many athletes do not volunteer their concussion symptoms (Delaney et al., 2015; Kroshus et al., 2015). Athletes often continue participating in their sport while experiencing symptoms or return to play before they have fully recovered (Delaney et al., 2015; Kroshus, Daneshvar, Baugh, Nowinski, & Cantu, 2013). In fact, studies done with NCAA college athletes suggested that the number of concussions sustained was likely higher than the number of concussions reported to coaches or medical personnel (Agel, Dompier, Dick, & Marshall, 2007; Daneshvar et al., 2011; Echlin et al., 2012; Kroshus et al., 2013; Kroshus et al., 2014).

Kroshus and colleagues (2014) revealed that NCAA athletes have sometimes not reported their concussion symptoms to medical personnel or coaching staff. Similarly, Delaney and colleagues (2015) found similar under-reporting norms in a study concerning Canadian student-athletes. Researchers surveyed CIS female and male athletes to identify specific reasons why athletes decided not to seek medical attention during a game or practice when they believed they suffered a concussion. Frequently cited reasons for why those university athletes failed to disclose their symptoms during a game or practice included the following: not thinking the concussion was serious/severe and felt they could continue playing with little danger, fear that being diagnosed with a concussion would affect their standing with the current team or future teams, and fear that being diagnosed with a concussion would result in negative repercussions from the coach or coaching staff (Delaney et al., 2015).

Researches have also found that collegiate coaches can play a primary role in creating and reinforcing team cultures that value concussion symptom-reporting and concussion safety behaviours (Baugh et al., 2014; Kroshus et al., 2015). Communication between coaches and athletes about concussion safety can normalize or undermine a team's culture in which concussion under-reporting is prevalent (Kroshus et al., 2015). A survey-based study revealed the determinants of coach communication about concussion safety in NCAA Division I, II, and III contact or collision sports (Kroshus et al., 2015). Results showed that attitudes and beliefs of coaches regarding concussions were the strongest predictor of communication about concussion safety. Moreover, these attitudes and beliefs concerning concussion safety were only partially shaped by concussion knowledge (Kroshus et al., 2015). Another interesting finding was that differences in attitudes and beliefs about concussion safety were shaped by the gender of the coach and the gender of the team coached (Kroshus et al., 2015). Specifically, male coaches of

female teams adopted the safest attitudes and beliefs and communicated more strongly in support of concussion safety than female coaches of female teams and male coaches of male teams (Kroshus et al., 2015).

Another survey-based study on concussion reporting in NCAA collegiate football athletes showed that coaches' attitudes toward concussion reporting, or their attitudes perceived by their athletes, may impact their athletes' concussion reporting behaviours (Baugh et al., 2014). Higher levels of perceived coach support for concussion symptom-reporting was linked with significantly less undiagnosed concussions and with returning to play while experiencing symptoms less often (Baugh et al., 2014). This study also found differences in concussion symptom-reporting between freshman and older team members. Freshmen players were more likely than their older teammates to perceive their coach as more supportive of concussion reporting (Baugh et al., 2014). Such evidence may imply that during an athlete's collegiate sporting career, perceived coach support for reporting a concussion decreases with time as a result of increased exposure to their coach and the competitive sport environment (Baugh et al., 2014). Evidently, research findings concerning collegiate athletes and concussion symptom reporting have revealed under-reporting norms in male and female athletes and have also highlighted that coaches can create, reinforce, or change a culture of risk taking and toughness through proper communication with their athletes (Atkinson, 2010; Delaney et al., 2015; Kroshus et al., 2013; Kroshus et al., 2015; Wiese-Bjornstal, 2010).

**Emotional sequelae.** Clinical evidence suggests a connection between concussion and changes in collegiate athletes' emotional state (Kontos et al., 2012; Mainwaring et al., 2010). Research specific to collegiate athletes has found that post-concussion symptoms exacerbate emotional responses to injury, such as depression, confusion, fatigue, anger, irritability, and

anxiety (Kontos et al., 2012; Mainwairing et al., 2010; Vargas, Rabinowitz, Meyer, & Arnett, 2015; Yang, Peek-Asa, Covassin, & Torner, 2015). According to several researchers, these emotional responses can aggravate the overall effect of a concussion in collegiate athletes (Hutchison et al., 2009; Mainwairing et al., 2010). Consequently, concussion symptoms may be intensified when combined with several emotional responses (Mainwairing et al., 2010). The relationship between collegiate athletes' emotional responses and concussions may be influenced by the injury's psychosocial factors, such as the lack of a definite return-to-play date, the removal and isolation from sport, and the lack of social support (Kontos et al., 2012; Mainwairing et al., 2010).

A recent case-control study was undertaken in an effort to better describe the prevalence of depressive symptoms in NCAA collegiate athletes following a concussion (Vargas et al., 2015). Researchers investigated NCAA collegiate athletes' depressive symptoms at baseline and post-concussion and compared these levels and change of symptoms to a control group with no reported concussion in the past year. Vargas and colleagues then examined the baseline predictors for post-concussion depression symptoms. Results suggested that a large proportion of athletes showed a significant increase in depression symptoms post-concussion (Vargas et al., 2015). In a similar manner, Kontos and colleagues' (2012) prospective study examined the relationship of sport-related concussion with depression and neurocognitive performance and symptoms among male and female high school and college athletes. In this study, researchers used four different timelines (i.e., baseline, 2 days, 7 days, and 14 days) to evaluate post-concussion changes. With respect to the collegiate athletes in their study, a significant increase in depression at 14 days post-concussion occurred (Kontos et al., 2012), suggesting that depression in collegiate athletes suffering from a concussion may become prevalent when recovery time is

prolonged. Finally, results from Mainwaring and colleagues' study (2010) of CIS athletes' emotional responses to concussions and ACL injuries were similar to those reported by both Kontos et al. (2012) and Vargas et al. (2015). After completing the short version of the Profile of Mood States (POMS), athletes with concussion reported significant changes in total mood disturbance and depression post-injury, which allowed Mainwaring and colleagues (2010) to conclude that depression can interfere with cognitive processes, such as working memory and inhibition, and may hinder return-to-play decisions.

Research findings related to collegiate athletes and post-concussion depression symptoms may be attributable to factors specific to the collegiate sport environment (Kontos et al., 2012). For example, collegiate athletes are more invested in their sport because of increased competition levels, as well as academic and scholarship pressure (Heller, Bloom, Neil, & Salmela, 2005). In turn, athletes may become frustrated and socially isolated (i.e., from sport and academics) the longer they are removed from their respective sport due to a sport-related concussion (Kontos et al., 2012). Evidently, an emotional response such as depression can negatively affect an athlete's academic performance as well as social functioning (Covassin, Elbin, Larson, & Kontos, 2012). Such evidence warrants consideration from individuals working with collegiate athletes to ensure that additional attention and monitoring is given to collegiate athletes experiencing symptoms of depression during concussion recovery.

**Gender differences.** Research has suggested that female athletes may be at a greater risk of suffering a concussion compared to their male counterparts (Covassin, Elbin, Crutcher, & Burkhart, 2013; Dick, 2009; Gessel et al., 2007; Hootman, Dick, & Agel, 2007; Lincoln et al., 2011; Marar, McIlvain, Fields, & Comstock, 2012). Specific to North American collegiate athletes, gender differences related to concussion incidence have revealed a greater prevalence of

concussions in women's sports than in male sports (Covassin, Swanick, & Sachs, 2003; Hootman et al., 2007). It is currently unclear whether the concussion incidence data is a true difference or is influenced by the fact that female athletes are more likely to be forthcoming in their reporting of concussion symptoms than males (Dick, 2009). Researchers have also identified possible gender differences in concussion symptoms and neurocognitive function in collegiate athletes (Covassin et al., 2013; Macchiocchi, Barth, Alves, Rimel, & Jane, 1996). In fact, a recent study by Covassin and colleagues (2012) examined a large cohort of NCAA collegiate athletes and found that female athletes had greater cognitive impairment, such as impaired visual memory and slower reaction time, and self-reported more concussion symptoms than male athletes, such as migraines. Therefore, gender differences have been found in concussion incidence and symptom typology and severity, where females may be more imminent in reporting concussion symptoms and may experience a greater number of physical and psychological symptoms (Covassin, Elbin, Harris, Parker & Kontos, 2012; Dick, 2009).

In sum, college athletes are a particularly vulnerable population due to their participation in activities with a high risk of brain trauma (Kroshus et al., 2014) and have been linked to several issues surrounding concussions such as reporting, emotional sequelae, and gender differences. In this regard, studies examining concussion reporting have shown that the number of concussions sustained by collegiate athletes was likely higher than the number of concussions reported to coaches or medical personnel by collegiate athletes (Delaney et al., 2015; Kroshus et al., 2014). Researchers have also found that collegiate coaches can play a primary role in creating and reinforcing team cultures that value concussion symptom-reporting and concussion safety behaviours (Baugh et al., 2014; Kroshus et al., 2015). With regard to emotional sequelae, findings have shown that post-concussion symptoms exacerbate emotional responses to injury,

such as depression, confusion, fatigue, anger, irritability and anxiety. Finally, gender differences have revealed that female collegiate athletes may be more forthcoming in reporting concussion symptoms and may experience a greater number of physical and psychological symptoms than male collegiate athletes (Covassin, Elbin, Harris, Parker & Kontos, 2012; Dick, 2009).

### **Integrated Model of the Response to Sport Injury**

Athletic injury is often perceived as a stressful event and may be threatening to an athlete (Wiese-Bjornstal et al., 1998). The integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) is a widely recognized framework that explains the complex sport-injury process (see Appendix B for an adapted version of the model). This conceptual framework suggests that athletes' responses to injury comprise several cognitive, emotional, and behavioural responses as they cope with sport injury through a dynamic process (Albinson & Petrie, 2003; Madrigal & Gill, 2014; Wiese-Bjornstal et al., 1998).

According to this model (Wiese-Bjornstal et al., 1998), several pre-injury factors affect an athlete's injury recovery. These pre-injury factors are separated into two exclusive categories: personal factors and situational factors (Wiese-Bjornstal et al., 1998). Personal factors include personality, coping resources, previous history of stressors, age and gender, and personality characteristics (Wiese-Bjornstal et al., 1998). In turn, situational factors include level of competition, coach influence, social support, teammate influence, medical personnel support, as well as the overall rehabilitation environment surrounding the athlete (Wiese-Bjornstal et al., 1998). Both personal and situational factors exert their effects on athlete's emotional responses following injury (Wiese-Bjornstal et al., 1998). The influences of personal and situational factors on emotional responses are mediated by the athlete's cognitive appraisal, which refers to the athlete's perceptions of his or her abilities to cope with the injury (Mitchell, 2001; Wiese-

Bjornstal et al., 1998). The athlete's perception of the injury determines the individual's emotional response, such as anger, depression, or relief (Wiese-Bjornstal et al., 1998). In turn, the emotional response to injury affects behavioural outcomes that ultimately impact the physical and psychological recovery outcomes (e.g., adherence to the rehabilitation program). In short, the integrated model implies that once an athlete is injured, he or she will experience a range of thoughts, emotions, and feelings that may influence an athlete's behaviours (Clement, Arvinen-Barrow, & Fetty, 2015; Wiese-Bjornstal et al., 1998). The interaction between the different components of the model can be seen as an "upward spiral" (Clement et al., 2015; Wiese-Bjornstal et al., 1998). As the rehabilitation advances, the athlete's thoughts, emotions, and behaviours often become more positive since the individual progresses towards full injury recovery (Clement et al., 2015; Wiese-Bjornstal et al., 1998).

Qualitative studies investigating NCAA Division I and II athletes' psychological responses during injury recovery have been framed around Wiese-Bjornstal and colleagues' integrated model (1998) and have provided evidence explaining various components of the model (Clement et al., 2015; Madrigal & Gill, 2014). For example, Madrigal and Gill's (2014) case study used this theoretical framework to explore four NCAA Division I athletes' psychological strengths and emotional responses at four different time points; before their season, once they became injured, midway through rehabilitation, and when they were cleared to return to sport. Their results indicated that mental toughness, hardiness, and optimism varied over time and across cases, with broad individual differences in response to injury, providing additional support for the claim that injury recovery is a unique, ongoing, dynamic process (Madrigal & Gill, 2014). Similarly, a recent qualitative study by Clement and colleagues (2015) explored injured NCAA division II athletes' cognitive appraisal and emotional reactions during

rehabilitation by collecting data through semi-structured interviews. Findings revealed that athletes' cognitive appraisals and emotional and behavioural responses varied over time during rehabilitation (Clement et al., 2015). Moreover, results also showed that athletes' emotional reactions were influenced by numerous prominent personal factors, such as injury severity and recovery status, as well as situational factors, such as relationships with coaches and sport medicine professional influences (Clement et al., 2015). These findings also provide further support for the claim that injury recovery is a constantly changing process, whereby personal and situational factors interact and exert their effect throughout injury rehabilitation (Clement et al., 2015). Therefore, results from Madrigal and Gill (2014) and Clement and colleagues (2015) were framed around the integrated model as a theoretical framework to better understand how personal, situational, and psychological factors interact and exert their effect throughout the dynamic injury rehabilitation process.

In sum, Wiese-Bjornstal and colleagues' (1998) integrated model of response to injury suggests that injury recovery is a dynamic process. Within this integrated model of response to injury, three primary components called cognitive appraisal, emotional response, and behavioural response, reciprocally influence each other throughout rehabilitation (Wiese-Bjornstal et al., 1998). Moreover, the recovery outcome is also affected by situational, personal and physical factors throughout the recovery rehabilitation. The integrated model of response to sport injury has been used in recent qualitative research to frame results surrounding NCAA Division I and II athletes' psychosocial responses to sport injury rehabilitation (Clement et al., 2015; Madrigal & Gill, 2014).

### **Social Support**

The integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) highlights the role of social support as both a situational variable and as a coping resource for the injured athlete. An athlete's inability to cope in the proper way may affect the outcome of the rehabilitation and, at times, may predict burnout and the athlete's withdrawal from competitive sport (Anshel, 1996; Anshel, Porter, & Quek, 1998). To date, a large amount of research on athletic injury has supported the value and impact of social support in coping during the rehabilitation period (e.g., Bianco, 2001; Clement et al., 2015; Wiese-Bjornstal et al., 1998; Yang et al., 2010) as well as following traumatic brain injuries (Caron et al., 2013). Likewise, research evidence revealed that satisfactory social support has been associated with improved recovery rates, increased motivation during recovery, and reduced distress after injury (Barefield & McCallister, 1997; Bianco, 2001; Udry, 1997; Hardy, Crace & Burke, 1999).

Shumaker and Brownell (1984) defined social support as “an exchange of resources between two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient” (p. 13). Social support is also explained as a multidimensional construct in injury rehabilitation (Bianco, 2001; Robbins & Rosenfeld, 2001). Richmand, Rosenfeld, and Hardy (1993) identified eight types of social support: listening support, emotional support, emotional challenge, reality confirmation, task appreciation, task challenge, tangible assistance, and personal assistance. Injury rehabilitation research has shown that injured athletes seek out different types of social support from several sources that include family and friends, health professionals, coaches, and teammates (Gould et al., 1997; Mainwairing et al., 2010; Udry et al., 1997). The type of social support given may vary depending on the situation, provider, and the gender (Robbins & Rosenfeld, 2001). For example, Yang and colleagues (2010) found female and male athletes equally relied on friends and family and support, however, female

athletes reported relying on the coach less than male athletes (Yang et al., 2010). In fact, female athletes reported higher satisfaction scores with the social support received from sources disclosed, except for coaches (Yang et al., 2010). This finding is congruent with other research evidence indicating that female athletes perceive more emotional support from friends and family, but not necessarily from coaches (Abrahamsen, Roberts, Pensgaard, & Ronglan, 2008; Judge et al., 2012). The following section will present research findings related to the different types of social support provided to collegiate athletes by coaches, family members, peers, as well as health professionals during injury recovery.

Coaches can play an important role in the facilitation and adherence to the rehabilitation program of an injured athlete (Bianco, 2001). In fact, coaches are known to provide sufficient task challenge and task appreciation support during injury recovery (Bianco & Eklund, 2001; Corbillon, Crossman, & Jamieson, 2008; Rosenfeld, Richmond, & Hardy, 1989). However, several studies have shown that injured athletes perceived their coaches' emotional support as insufficient during their recovery process (e.g., Bianco, 2001; Caron et al., 2013; Corbillon et al., 2008; Rosenfeld, Richmond, & Hardy, 1989; Udry, Gould, Bridges, & Tuffey, 1997). For example, Rosenfeld and colleagues (1989) found that coaches were perceived as providing task challenge, task appreciation, and emotional challenge support, while not providing reality confirmation support, listening support, and emotional support. Moreover, findings from Corbillon and colleagues' study (2008) showed that athletes were more satisfied with the task-challenge support provided by coaches, but were more satisfied with the emotional support provided by their teammates. This finding is consistent with Bianco and Eklund's (2001) study showing that athletes viewed teammates as better providers than coaches in relation to emotional support. These findings could be related to the fact that coaches are known to maintain emotional

distance between themselves and their injured athletes to avoid privileging them over other players (Rosenfeld, Richman, & Hardy, 1989). Specific to concussion rehabilitation, Caron and colleagues' (2013) study revealed the experiences of retired professional hockey players who suffered numerous concussions in their career felt that some coaches were unsupportive and controlling during their rehabilitation. Accordingly, findings have shown that peers are the main providers of emotional support to injured athletes (Bianco & Eklund, 2001; Corbillon et al., 2008). In fact, researchers have found that injured university athletes reported teammates as being more available to provide emotional support than their coaches (Bianco & Eklund, 2001; Corbillon et al., 2008; Rosenfeld, Richman, & Hardy, 1989). For example, Corbillon and colleagues (2008) examined CIS injured athletes' perceptions of the social support provided by coaches and teammates during their injuries and found that teammates were significantly more available than coaches to provide emotional support, since they share most of their experiences with their fellow teammates. Finally, family members have also been reported as a primary source of emotional support for injured collegiate athletes (Udry, 1997). Evidence has shown that the type of support most commonly given by an athlete's family is emotional support and tangible assistance (Morgan & Giacobbi, 2006; Udry 1997). For example, Covassin and colleagues (2014) recently revealed that injured athletes who suffered from a concussion or an orthopaedic injury relied on their family more than other social support providers. Therefore, coaches, peers and family members play different roles in the provision of social support to injured athletes, as coaches mainly provide task challenge support, and peers and family members mainly provide emotional support.

Literature within the sport-injury domain has also shown that athletes may turn to health professionals (e.g., athletic therapists) for emotional support (Bianco, 2001; Barefield &

McCallister, 1997; Yang et al., 2010). Athletic therapists may be viewed as an important source of emotional support given the amount of time athletes spend by their side when rehabilitating (Covassin et al., 2014). Moreover, Yang and colleagues (2010) found that a significant number of NCAA athletes turned to athletic trainers and physicians for emotional support after being injured. This finding may be partially related to the fact that most collegiate athletes live away from their families, reducing the family support structure (Yang et al., 2010).

Although health professionals play a key role in providing emotional support for athletes with musculoskeletal injuries, this may not be the case for athletes with a concussion. Athletes suffering from concussions tend to spend less time with athletic trainers since there are very few rehabilitation treatments for concussions (Covassin et al., 2014). In fact, Covassin and colleagues (2014) found that athletes with concussions relied less on their athletic trainers for social support than did athletes with orthopaedic injuries. This may be because athletes with orthopaedic injuries have visible physical limitations, which attracts more attention or support from individuals in their social support network (Covassin et al., 2014). Also, Caron and colleagues (2013) revealed that professional hockey players who retired as a result of concussions felt isolated and misunderstood during their recovery. Perhaps this is attributed to the fact that athletes suffering from a concussion must recover at home away from their respective athletic facility, increasing the separation and hostility from teammates and coaches (Caron et al., 2013; McCrory et al., 2013). In turn, athletes suffering from concussions may receive less social support overall and thus have a potentially lower level of satisfaction with the support received due to the invisible nature of concussions (Covassin et al., 2014).

To summarize, social support can be very beneficial to athletes coping with injury. A large amount of research on injury recovery has supported the value and impact of social support

in coping during the rehabilitation period (e.g., Bianco, 2001; Clement et al., 2015; Wiese-Bjornstal et al., 1998; Yang, Peek-Esa, Lowe, Heiden, & Foster, 2010). Research concerning college athletes revealed that athletes sought seek social support to cope with injury from family, athletic therapists, and especially teammates. With regards to concussion, athletes may rely less on their athletic trainers for social support than do athletes with musculoskeletal injuries and may receive less social support from teammates and coaches.

## **Conclusions**

In sum, concussions have received greater attention in the last decade and are now more commonly recognized as a serious injury among athletes in a variety of sports (Johnson et al., 2015). A growing body of scientific evidence has identified a combination of neurological, cognitive, and behavioural consequences of athletes who have sustained a concussion, which can negatively affect athletes' quality of life (e.g., Caron et al., 2013; Gavett, Stern, & McKee, 2011; Kroshus et al., 2015; Kroshus et al., 2014). These consequences have raised the awareness of the emerging public health-concerns surrounding this brain injury in sport (Dick, 2009). Specifically, collegiate athletes are a particularly vulnerable population due to their participation in activities with a high risk of brain trauma (Kroshus et al., 2014). In fact, North American collegiate athletes have been associated with several issues surrounding concussions such as concussion under reporting, emotional sequelae, such as depression and anxiety, and gender differences in concussion incidence and symptom typology. Despite these findings, researchers have yet to discern the optimal care for collegiate athletes experiencing protracted concussion symptoms throughout their rehabilitation process.

The integrated model of sport injury and rehabilitation (Wiese-Bjornstal et al., 1998) suggests that injury recovery is a dynamic process that it is dependent upon both personal and

situational factors and how they interact with each other. These factors influence athletes' cognitive appraisal (i.e., thoughts) of a sport-related injury, which leads to emotional and behavioural responses that ultimately impacts the physical and psychological recovery outcomes. This integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) highlights the role of social support as both a situational variable and as a coping resource for the injured athlete. To date, a large amount of research on athletic injury has supported the value and impact of social support during the rehabilitation period (e.g., Bianco, 2001; Yang et al., 2010). Additionally, research concerning collegiate athletes' injury recovery reported friends and family members often provided emotional support (Bianco, 2001; Udry et al., 1997), and medical personnel and coaches frequently provided informational and technical support (Bianco, 2001; Yang et al., 2010). In regard to concussions, collegiate athletes reported relying less on athletic trainers and teammates for social support than athletes with musculoskeletal injuries (Covassin et al., 2014). Thus, given the unique context of collegiate athletics and the particular characteristics of concussion recovery, an in-depth understanding of female athletes' experiences with protracted concussion symptoms is needed. Reasons include both ensuring that athletes do not return-to-play with emotional sequelae and that appropriate social support is provided to athletes experiencing a concussion (Caron et al., 2013; Mainwaring et al., 2010). The following chapter will present the qualitative approach that will be used for this current study in order to better understand the experiences of female collegiate athletes who suffered from protracted concussion symptoms.

## **Chapter 3**

### **Methods**

This chapter will highlight the qualitative methodology used in the current study. Specifically, the design, participants, procedure, data collection, and validation elements are discussed. The data analysis procedure used in this study, Interpretative Phenomenological Analysis (IPA), is also outlined and explained (Smith, Flowers, & Larkin, 2009).

Traditionally, sport psychology research reduced complex human behaviour to smaller components instead of studying the person as whole (Martens, 1987). Martens (1987) suggested studying human behaviour from an individual's experiences by using qualitative methods (e.g., Culver, Gilbert, & Trudel, 2003; Denzin & Lincoln, 2012; Smith et al., 2009; Streat, 1998). In a review of sport psychology research, Culver, Gilbert, and Sparkes (2012) found a 68% increase in the percentage of qualitative studies published since the 1990s. Rather than adopting an objectivist position as quantitative research does, qualitative research believes that multiple subjective realities exist (Creswell, 2013; Sparkes & Smith, 2014). Researchers conducting qualitative inquiry collect data in the participant's natural settings and try to gain a better understanding of the world in which they live (Creswell, 2013; Sparkes & Smith, 2014).

#### **Interpretative Phenomenological Analysis**

Qualitative research methods have been employed to allow participants to give responses based on their experiences and perceptions as they create meaning of events within their realities (Strauss & Corbin, 1998). Researchers have used five different approaches of qualitative inquiry: narrative research, phenomenology, grounded theory, ethnography, and case study (Creswell, 2013). While the general procedures of research are similar across the five approaches (Creswell, 2013), the differences lie in how the researcher collects and analyzes the data (Sparkes & Smith,

2014). In particular, phenomenological studies describe the essence of individuals' lived experiences of a phenomenon (Creswell, 2013; Greene, 1997; Robinson & Reed, 1998). According to Welman and Kruger (1999), researchers should use this qualitative approach when concerned "with understanding social and psychological phenomena from the perspectives of people involved" (p. 189). After identifying an "object" of human experience, the researcher must collect data from individuals who have experienced the phenomenon to develop a compound description of the core of the experience for all of the individuals in the study (Creswell, 2013). This compound description entails "what" the individuals experienced and "how" they experienced it (Creswell, 2013; Moustakas, 1994).

Aside from these procedures, phenomenology has strong philosophical roots (Creswell, 2013; Groenewald, 2004) dating back to the writings of the German philosopher Edmund Husserl (1859-1938), who is regarded as one of the founders of phenomenology in the twentieth century (Creswell, 2013; Vanderberg, 1997). According to Husserl, anything outside immediate experiences must be ignored (Groenewald, 2004). Hence, the outside world is reduced to the contents of personal consciousness, which refers to personal realities that are treated as "phenomena" and the only concrete data from where to begin (Eagleton, 1983; Groenewald, 2004). The aim of phenomenology is to reduce individual experiences of a phenomenon to a composite description of the essence of the experience (Creswell, 2013).

Since the 1980s, phenomenology has been popular within social and health sciences, more specifically in sociology (Borgatta & Borgatta, 1992; Swingewood, 1991), psychology (Giorgi, 1985; Polkinghorne, 1989), nursing and the health sciences (Nieswiadomy & Cobb, 1993; Oiler, 1986), education (van Manen, 1990), and sport psychology (Caron, Bloom, Johnston, & Sabiston, 2013; Levy, Polman, Nicholls, & Marchant, 2009; Nicholls, Holt, &

Polman, 2005; Tamminen, Holt & Neely, 2011). Within sport psychology, a specific phenomenological approach, called Interpretative Phenomenological Analysis (IPA), has been developed in the last decade. IPA has been utilized with research in regard to injury recovery, rehabilitation adherence, adversity, psychological experiences, and concussions (e.g., Arvinen-Barrow, Penny, Hemmings, & Corr, 2010; Caron et al., 2013; Hefferon & Ollis, 2006; Nicholls, 2007; Nicholls et al., 2005; Tamminen et al., 2011). Moreover, IPA researchers are especially interested in what happens when the everyday flow of lived experience takes on a particular significance for individuals, which usually occurs when something important has happened in their lives.

While IPA has its roots in Husserl's (1973) phenomenology, more recent interpretative phenomenology can be traced to hermeneutics (van Manen, 1997) and symbolic interactionism (Denzin, 1995) because it is concerned with meanings constructed by interactions within a social and personal world. In this way, IPA is also an inductive approach that involves detailed examination of a small number of cases, and making interpretations across cases (Smith et al., 2009). These latter interpretations also foster the integration of researcher experiences, existing theory, and previous research findings if such interpretations are evidenced in the data (Smith, 2004; Larkin, Watts, & Clifton, 2006). Consistent with the researcher's interpretivist position, IPA methodology involves the researcher understanding the meanings participants give to their own experiences, while knowledge is developed through a process of interpretations (Smith et al., 2009).

In sport, IPA studies have investigated particular experiences related to athletes (e.g., Caron et al., 2013; Levy et al., 2011; Nicholls et al., 2005; Tamminen et al., 2011), coaches (e.g., Fawcett, 2006; Lundkvist, Gustafsson, Hjälm, & Hassmén, 2012), and physiotherapists

(Arvinen-Barrow et al., 2010). For example, Tamminen and colleagues (2011) explored experiences of adversity and perceptions of elite Canadian female athletes who competed internationally in various sporting events. Tamminen, the first author, read each participant's transcripts, recorded notes regarding thoughts and impressions about events within the transcript, developed notes into emerging themes, established connections across these themes, and repeated this initial process for each participant. Themes were also examined across participants to look for similarities and differences in descriptions and interpretations of adversity. Moreover, the first author created individual profiles for each participant to illustrate the meaning of adversity. After these initial steps, the second and third authors analyzed the athletes' transcripts, themes, and profiles and provided their own interpretations as well as suggestions to help refine the first author's interpretations. All three researchers had previously competed as athletes at different levels of competition, which allowed them to view the participants as "teachers" and helped the authors to interrogate and analyze the details of their experiences. In another IPA study, Caron and colleagues (2013) examined the effects of multiple concussions on retired National Hockey League players. Throughout the data analysis process, members of the research team had different roles. The lead author conducted the first three steps: reading and rereading of each transcript, note taking on thoughts and impressions relating to information in the transcript, and completing a detailed analysis of the events, situations, and experiences discussed in the interviews. Collaboratively, the lead author and co-authors identified and connected themes using the lead author's reflective journal, analysis notes, and literature searches. Then, the research team identified profiles for each of the participants with a detailed narrative and interpretation of their personal experiences with concussions. Finally, these profiles were used to identify emerging themes and to connect themes within and across the participants. The lead

researcher had suffered multiple concussions and was able to integrate his personal experiences with concussions to make interpretations while the co-authors looked for similarities and differences in the men's experiences with concussions according to their own interpretations. Therefore, studies by both Tamminen and colleagues (2011) and Caron and colleagues (2013) highlighted how IPA utilizes researchers' experiences to develop knowledge through interpretations to better understand psychological and social phenomenon in sport. The current study used an IPA approach to better understand the experiences of female collegiate athletes who suffered from protracted concussion symptoms. The lead author has experience as an elite female athlete who also experienced protracted concussion symptoms.

### **Participants**

Similar to most qualitative interviews, studies using IPA are conducted with relatively small, homogenous samples, which include participants closely linked to the research question (Braun & Clarke, 2013; Smith et al., 2009; Sparkes & Smith, 2014). This approach helps preserve the individuality of the participants and allows the researchers to better understand how events and actions can be shaped by the circumstances in which they occur (Sparkes & Smith, 2014). The number of participants required to conduct a phenomenological study has been discussed among several authors (Creswell, 2013; Padgett, 2008; Riemen, 1986; Smith et al., 2009; Smith & Osborn, 2003, 2008). Specific to IPA, Smith and colleagues (2009) noted that while “there is no right answer to the question of sample size, three to six participants is an ideal sample size for a Masters-level IPA study” (p. 51-52). Finally, criterion sampling involves selecting participants who meet a predetermined list of criteria (Creswell, 2013). The current participants were purposely chosen based on the following criteria: Canadian Interuniversity Sport (CIS) female athletes who were on the roster of an interactive sport team within the last

two years, experienced protracted concussion symptoms for a minimum of eight weeks, received medical clearance and returned to sport/activity prior to the start of the study, and had one or more years of competitive experience at the CIS level under the same head coach.

All players were able to communicate in English or French. At the time of the interview, one participant had played one year at the CIS level, one had played two years, one had played three years, while the final two had played five years at this level and had recently graduated from university at the time of the interviews. The athletes were recruited from four different institutions within the CIS. These athletes' places of residence ranged across our country, from the Maritimes to British Columbia. Two athletes had recently graduated from university, two athletes were in their third year of university, and one was in her fourth year of university. They played in the team sports of rugby, volleyball, and ice hockey and all participants had suffered a medically-diagnosed concussion and had protracted concussion symptoms that lasted between 10 weeks to 14 months. More specifically, two athletes had symptoms for 10 weeks, another two athletes had symptoms for 12 weeks, and one athlete had symptoms for 14 months (and this athlete was the only one with a season-ending concussion). Moreover, all of the participants returned to sport following their concussion for at least one season before the time of their interview. Additional information about the participants' concussion history and athletic background is provided in Appendix F. In addition, a brief player profile was created for each participant to provide unique information about each individual. A pseudonym was given to each of the five athletes in our study to protect their anonymity:

*Sonia* was a hockey player who suffered a season-ending concussion during a league game in the middle of her rookie year. Her concussion symptoms persisted for 14 months, which was longer than any other participant. Following her concussion, Sonia noted that her mood was

severely altered and felt like “a different person”, and could not “think properly”. She also provided a clear description of how her academic life was negatively affected by her concussion as she went from being an honour student to failing several classes and having to withdraw from university for one semester before returning.

*Julie* was a hockey player who suffered a concussion during her rookie year training camp. Her concussion symptoms lasted for 10 weeks. Julie felt social support was “the biggest thing” that facilitated her concussion recovery. Despite being new to the hockey team at the time of her concussion, she received a substantial amount of social support from her coaches and teammates throughout her recovery, which she noted was extremely helpful. In particular, Julie said she developed a special bond with her coach during her rehabilitation, whom she said was “like a parent” to her. Developing a close relationship with her coach was particularly important for Julie because her family lived on the other side of the country.

*Rebecca* was a volleyball player who suffered a concussion at the beginning of her third CIS season during a practice. She suffered from concussion symptoms for 12 weeks. Rebecca’s concussion had several negative repercussions, which included “getting kicked out” of her academic program due to poor grades and struggling with persistent weight issues. As a result, she suffered from depression, which led her to attempt suicide three months following her concussion. At the time of the interview, it had been two years since Rebecca sustained her concussion and she credited her concussion experience for changing her career path as she is now a qualified youth worker in hopes of “giving a second chance” to others in need.

*Marie* was a rugby player who suffered a concussion during a regular season game in her second CIS season. Marie described herself as an aggressive and competitive player who “jumped at the opportunity” of playing a contact sport in university. Her concussion symptoms

persisted for 10 weeks. Additionally, Marie thoroughly explained the academic struggles she faced following her concussion and strongly recommended doing “small doses” of studying and taking breaks during a session. She emphasized the importance of educating varsity athletes about concussions since she admitted to “Googling” information to reassure herself that the behaviour changes and physical symptoms she was experiencing post-concussion stemmed from her injury.

*Chantal* was a hockey player who suffered a concussion in her final year of eligibility that lasted 12 weeks. Chantal provided vivid descriptions of her physical and psychological symptoms she endured as a result of her protracted concussion symptoms. Chantal described feeling “stale” and “stuck in my own mind” as opposed to being her usual optimistic self. She felt her psychological symptoms were exacerbated by being isolated from her team, by the lack of a return date, and by the unexpected return of her symptoms after being asymptomatic for several days. Chantal felt compelled to share her story to help future generations of athletes better understand the psychological responses of concussions.

## **Procedure**

After receiving approval from the McGill University Research Ethics Board, the research team contacted coaches by email with a recruitment script (see Appendix C) to help identify athletes who met the selection criteria. The coaches were asked to forward a second recruitment script to potential participants (see Appendix D). Athletes who were interested were sent a consent form (see Appendix E), along with information describing the purpose of the study and the methods of data collection. Each interview was conducted in line with IPA guidelines (Smith et al., 2009). All interviews were audio recorded using a Panasonic RR-US591 recording

instrument. Each interview was encoded to ensure the anonymity of participants. Interviews were transcribed verbatim and stored using the NVivo 10 software package.

### **Data Collection**

According to Culver and colleagues (2003), interviewing has been the most effective method of data collection in qualitative research. Moustakas (1994) also described interviews as the primary source of data gathering in phenomenological research. Data for the current study was collected using a semi-structured interview format (Patton, 2002). The following section will describe the semi-structured interview, the interviewer, as well as the interview guide.

**Semi-structured interview.** This interview format is similar in style to an ordinary conversation with the interviewer asking predetermined questions and probes, while the participant does most of the talking (Patton, 2002). This method allowed the interviewer to focus on the topic of discussion but allowed the *participant* the freedom to answer openly without limitations (Rubin & Rubin, 2012). In response to some critiques of IPA, the open-ended nature of the interview enabled dialogue between the participant and the interviewer and helped prevent theoretical and the researchers' biases from influencing the athletes' constructions of their experiences with protracted concussion symptoms (Allen-Collinson, 2009; Brocki & Weardon, 2006). Another interview procedure called probing was used to redefine terminology and correct misunderstandings (Patton, 1987). This allowed the interviewer to further explore any topic brought up and to get more elaboration or details if desired. Hence, when appropriate, probe questions (e.g., "What do you mean by...?" "How did that make you feel?" "Tell me more/explain more about that?") were asked to further explore specific issues in depth and to clarify certain themes raised during the conversations. Furthermore, the interviewer wrote notes in her reflective journal following each interview relating to the interviewee's body language, tone of

voice, facial expressions, emotions, key moments during the interview, as well as overall impressions to help interpret their experiences and to add relevant information and context to the IPA analysis.

**Interviewer.** IPA was chosen since I am a retired collegiate athlete who also suffered from protracted concussion symptoms. Additionally, I was an elite-level volleyball player (Canadian National team player and CIS athlete) who experienced a number of sport injuries during my volleyball career, including a career-ending concussion. This experience allowed me to make interpretations across cases according to my own lived experiences. My sporting background also enabled me to build rapport with the participants and helped me better understand and use jargon commonly used by university athletes during the interviews. I kept a detailed journal comprised of notes taken during the interview and immediately following the discussion with each participant. A pilot interview was also conducted with a retired CIS female athlete who suffered from post-concussion symptoms in the past year. This pilot interview was video recorded and then evaluated by an individual who has considerable experience in this domain. This particular individual observed a video recording of the pilot interview to ensure that I was able to effectively build rapport, explain ethical procedures, and describe the interview format to participants. This pilot interview allowed me to refine my interview skills.

**Interview guide.** The 13-question interview guide (see Appendix G) was created by members of the research team and is divided into four main parts. The interview guide was created to gather information on *what* the participants experienced and *how* they experienced their protracted concussion symptoms along with the social support provided during their rehabilitation. Moreover, the interview guide was based on results from previous investigations on athletes' perceived provision of social support during rehabilitation (Bianco, 2001; Bianco &

Eklund, 2001; Covassin, Crutcher, Bleecker, Heiden, Dailey, & Yang, 2014; Corbillon, Crossman, & Jamieson, 2008; Rosenfeld, Richman, & Hardy, 1989; Yang, Peek-Asa, Lowe, Heiden, & Foster, 2010), results from previous investigations on the experiences of athletes with a concussion (Baugh, Kroshus, Daneshvar, & Stern, 2014; Caron et al., 2013; Covassin, Elbin, Crutcher, & Buckhart, 2013; Kroshus, Daneshvar, Baugh, Nowinski, & Cantu, 2013; Kontos, Covassin, Elbin, & Parker, 2012; Kroshus, Kubzansky, Goldman, & Austin, 2014; Mainwairing, Hutchison, Bisschop, Comper, & Richards, 2010; Vargas, Rabinowitz, Meyer, & Arnett, 2015; Yang, Peek-Asa, Covassin, & Torner, 2015), and the interviewer's rehabilitation experience as a collegiate athlete following a concussion.

The first section of the interview guide acquired demographical information about the participants. The opening questions focused on the participants' athletic career and history of injuries. The demographical information was analyzed separately from the rest of the interview data and resulted in 15 initial codes that were then grouped into three lower order themes. These lower order themes were combined into one higher order theme named "Athlete background and concussion history". A detailed narrative of this higher order theme was created and can be found in Appendix F. This initial section of the interview guide provided a smooth transition into five key questions, which focused on the participants' experiences with protracted concussion symptoms rehabilitation. These questions focused on the diagnosis of their latest concussion, the physical and emotional responses associated with their latest concussion, as well as the social support they received during their protracted concussion symptom recovery. The third section of the interview guide allowed the participant to reflect on the outcome of their protracted concussion symptoms and the influence of social support during their recovery. The final section afforded participants the opportunity to add information they felt was pertinent to the study. For

the current study, the research was not set out to test any specific theories of injury rehabilitation, but the integrated model of response to sport injury framework was used to identify the target phenomenon and to provide a comparative context for data analysis (Sandelowski, 1993). Finally, the last three sections of the interview guide were analyzed collectively in order to answer the four research questions highlighted in Chapter 1. The following section explains the data analysis process used for the current study.

### **Data Analysis**

According to Larkin and colleagues (2006), IPA is a flexible perspective used to approach the analysis of qualitative data. The primary interest of IPA's analytic focus is to direct the researchers' attention towards the participants' attempts to make sense of their experiences (Smith et al., 2009). IPA analysis has also been described as an iterative and inductive process, where each interview should be analyzed individually to find emerging themes before examining across the interviews (Smith et al., 2009). In this manner, the analysis of the qualitative data followed a sequential manner, beginning with analysis at an individual-level for each of the participants before proceeding to a group-level analysis that brought together all of the participants. Members of the research team had different roles in the analysis process. The primary researcher conducted the first three steps followed by a collaborative effort of the co-researchers and the primary researcher to complete the fourth and final step of the data analysis. This section will outline the detailed steps that the current study followed to analyze the data through individual and group level analysis according to Smith and colleagues' guidelines (2009).

**Individual level analysis.** The individual level data analysis began with the first author reading each transcript after it had been entered into NVivo 10 computer software program.

Once each transcript had been read in its entirety, the most thorough and detailed transcript was selected as a case document, and re-read several times to get a sense of the athlete's story (Smith et al., 2009). The second step involved initial note taking regarding thoughts and impressions about events contained within the transcript. After these notes were, the third step began by re-reading the transcript in order to make a detailed line-by-line analysis of the events, situations, and experiences discussed in the interview with the help of the primary researcher's reflective journal to interpret the discussions. This process involved a combination of the participant's original words, and the primary researcher's interpretations (Smith et al., 2009). As noted by Smith and colleagues (2013), the data was analyzed at three levels: (a) descriptive experiences, (b) the manner in which the participant described their experiences (i.e., linguistics), and (c) the primary researcher's interpretations about how the participant understood the experiences they described. Upon completion of the analysis of the first transcript, the same process was repeated for the other participants. In sum, steps one to three allowed the primary researcher to reflect on the findings from their own perspective as a former elite collegiate athlete, who has suffered from protracted concussion symptoms.

**Group level analysis.** The group level analysis began with the fourth step of the IPA data analysis. This step involved a collaborative effort with the co-researchers to look for patterns (i.e., similarities) and differences across cases (Caron et al., 2013; Smith et al., 2009). The researchers used the primary researcher's reflective journal, analysis notes, and a current literature review to identify inductive themes (Smith et al., 2009). Then, collectively, researchers identified a profile for each of the participants, along with a detailed narrative and interpretation of their experiences. These profiles were used to identify emergent themes and to connect themes within and across the participants' experiences. Each participant was assigned a pseudonym to

help protect her anonymity. Specific to the group analysis, a coding sheet was created for the first athlete's profile, and then emergent themes were mapped onto this master list for each subsequent player. The master list included theme names and operational definitions for researchers to find similarities and differences across participants' experiences and combine similar themes under higher order themes. During group level analysis, researchers worked together towards finding consensus and fit of supporting quotes for the higher order themes created. Time was allotted to expand, delineate and delimit operational definitions relating to these higher-order themes to ensure their coherency with supporting quotes. As recommended by Smith (2011), higher order themes were carefully created in order to give justice to each theme when writing the manuscript. Consistent with IPA, a peer reviewer discussed the definitions of the higher order themes created and noted transcripts, to confirm that the data analysis was appropriate and consistent (Smith et al., 2009). Specific to the four research questions identified for this study, 32 initial codes were analyzed and then grouped into 6 lower order themes. Finally, these lower order themes were combined to create three higher order themes.

The final section of the analysis was concerned with translating the higher order themes into a narrative account. The three higher order themes took the form of a narrative argument combined with verbatim extracts (i.e., quotes) from the participants' transcripts to support the case (Caron et al., 2013; Smith & Osborn, 2007). The results section presents the higher order themes.

### **Validity**

The validity of a study refers to the extent to which the results are an accurate representation of the phenomena studied in order for the data to be seen as useful (Yardley, 2008). In comparison to quantitative research, which emphasizes verification of the results,

validity in qualitative research emphasizes the process of the research (Creswell, 2013).

Although there are no set validity criteria that can be applied to all qualitative studies (Yardley, 2008), several techniques can be used (Creswell, 2013). As the present study is rooted in a phenomenological perspective, three traditional techniques previously adopted by several IPA studies (e.g., Caron et al., 2013; Levy et al., 2011; Nicholls et al., 2005) known as bracketing, member checking, and peer debriefing were applied. This section will highlight these validation techniques in order to enhance the quality and trustworthiness of the current study (Strean, 1998).

**Bracketing.** Bracketing is a validation method used by qualitative researchers to increase the rigor of a study by lessening the potentially unfavourable effects of the primary researcher's unrecognized preconceptions related to the research topic (Tufford & Newman, 2010). In this study, bracketing involved the primary researcher maintaining a reflective journal prior to and during the data collection and analysis. The primary researcher "bracketed" her personal experiences by writing down her observations, assumptions, and confusions concerning the topic studied, and by considering the influence of her personal values and rehabilitation experiences on the research data (Smith & Osborn, 2003). In addition, in this reflexive journal, the primary researcher included reasons for undertaking the research as well as assumptions regarding protracted concussion symptoms recovery and social support provision. Finally, the goal of this self-reflection was to minimize researcher bias to avoid the primary researcher from imposing her views on participants' accounts and interpreting their words in the context of her own concussion rehabilitation experiences.

**Member checking.** Member checks were used after data analysis was completed to ensure the adequacy of the information and protected against potential misinterpretations and

researcher subjectivity (Lincoln & Guba, 1985). Participants were given the opportunity to review a written copy of their results, including the transcripts, brief descriptions of the themes obtained from the entire data set, and interpretations. The participants were asked to make additions or corrections via written and/or verbal feedback in order to add to the depth of the data collected (Creswell, 2013; Lincoln & Guba, 1985). The primary researcher also asked the participants if their personal profile appeared to “fit” with the wider context of the entire data set and if it portrayed their personal interpretations of their experiences with protracted concussion recovery.

**Peer debriefing.** Many researchers have suggested that peer debriefing enhances trustworthiness and credibility of a qualitative study (Lincoln & Guba, 1985; Creswell, 2013). This technique allows impartial peers to review and assess transcripts, emerging categories from those transcripts, and any biases or assumptions made by the lead author. In this study, peer debriefing was achieved by having the second and third researchers collaborate with the primary researcher to review IPA analyses on all transcripts to ensure validity. The research team discussed the analyses until a joint agreement was reached regarding the emergent themes. Much time was spent expanding, delineating and delimiting operational definitions pertaining to the higher order themes created to ensure their coherency with constituent supporting quotes. Finally, the impartial peers investigated the transcripts and analyses for overemphasized points, biases and assumptions, and vague descriptions made by the lead author.

## Chapter 4

### Results

This chapter presents the results of the individual interviews conducted with five CIS female athletes who suffered from protracted concussion symptoms. During the analysis, the demographical information about the participants was analyzed separately from the rest of the interview data and made up 31% of the complete data set. This demographical information was presented in the previous chapter through player profiles and the rest of the analysis can be found in Appendix F. As such, this chapter focuses exclusively on the last three sections of the interview guide that were analyzed collectively to answer the four research questions highlighted in Chapter 1.

The interviews ranged from 41 to 70 minutes and combined for a total of 266 minutes. The inductive analysis of the five interviews resulted in a total of 46 pages of single-spaced text. From the text, 32 initial codes emerged, which were then organized into six lower order themes: *emotional responses to concussion*, *behavioural responses to concussion*, *uniqueness of concussions*, *academic environment*, *coaches' role*, and *support providers*. These six lower order themes were then combined into three higher order themes: *concussion injury responses*, *student-athlete concussion aftermaths*, and *network of support*. The following sections will provide a narrative argument combined with verbatim extracts (i.e., quotes) from the participants' transcripts for each of the three higher order themes. Quotes from the players will be followed by a pseudonym (e.g., Marie) to protect player confidentiality and to credit the player who provided the excerpt.

### Concussion Injury Responses: “I was a different person”

In addition to suffering physically from their concussions, all five participants reacted emotionally immediately following their concussion as well as throughout their rehabilitation. These injury responses were also accompanied by distinctive behaviours and actions. The data was analyzed to reveal that participants’ descriptions of changes after injury included *frustration*, *irritability*, *mood swings*, *weight issues*, and *depression*. While the injury responses that the athletes described varied in intensity and timeframe, they all had a significant impact during their concussion recovery.

A lot of the athletes started experiencing frustration at about the one-month post concussion diagnosis:

I was absolutely frustrated because one month after my concussion I was still experiencing symptoms. It made me so cranky. I just wanted to knock out people who complained about a headache... like, ‘Stop complaining about your issues in life while I’m trying to study with a concussion and you’re complaining about a stupid headache!’  
(Marie)

A month after my concussion, I started to realize that everything around me was still happening and that I was still in the same state. Whenever I thought about how I was still symptomatic, it made me upset, because I felt as though I couldn’t do anything (Chantal).

During the interviews, I noticed a change in the way Marie and Chantal spoke when they were talking about the length of their symptoms. Marie raised her voice, gestured, and said, “You just can’t do anything!” to emphasize the frustrations associated with her concussion. Similarly, one athlete kept mentioning how coping with this prolonged recovery led to feelings of irritability. In

fact, Sonia explained she felt as though she was living in “her own world”, where no one understood what she was going through:

When I talk about being a *different person* during my concussion recovery, I mean that I was a bitch, straight out! I became very selfish. People would try to help me, they would tell me that I was not the same person and I would just get offended. Since I was coping with so much during my prolonged recovery, I didn’t realize that I was behaving that way. There was a constant battle that my body was having and it just brought out the bitch in me (Sonia).

While Sonia shared this feeling of irritability during her interview, she also shook her head and laughed at her past behaviour saying she created her own “fantasy”. I interpreted that when these athletes tried to cope with their prolonged concussion symptoms, they felt trapped in their own realities. As noted in my reflective journal, I sensed that the participants felt imprisoned because they were not behaving as their usual self and felt as though they had no control over their own behaviours.

Correspondingly, athletes also talked about the mood swings they experienced as a result of their protracted concussion symptoms and the effect it had on their peers:

The most prevalent emotional responses I had were the mood swings. I didn’t even know why I was behaving that way, but it just happened. One day I would tell myself that I would heal quickly, then the next day I would be crying. I would cry for hours because I couldn’t see myself healing anytime soon. My morale wasn’t very strong. I dramatized everything. It was a lot to handle for my teammates... (Rebecca).

Seeing Rebecca roll her eyes and shake her head while reminiscing on her erratic behaviour made it more evident that she realized her emotions were altered by her concussion and not a

true reflection of her usual temper. Furthermore, both Sonia and Rebecca spoke about how their regular mood swings altered their personalities and likely influenced some poor decision-making. For example:

You are not yourself when you have a concussion, so at times the decisions that you make are wacky. For example, one day I chose not to go to write my exam. I thought it was okay. The sad thing is that I had studied and felt prepared for my exam the night prior to it. I had no reason not to go. I was telling myself that since I had a concussion, I didn't need to go write my exam, although I had started attending classes again. I woke up not caring at all about my exam. I had been preparing for three weeks for that exam and I woke up that morning to go write it. My bag was ready to go, but I just went back to sleep. Two months prior to my concussion, I probably wouldn't have made that decision, but at the time I didn't care. My roommates asked me if I was sure because they knew it was wrong... A few hours later that day, I woke up in a complete panic realizing that I have made such a stupid decision. I went to see our team doctor and explained to her how I didn't go write my exam and didn't understand why I had done that. I was crying uncontrollably! (Rebecca)

While Rebecca explained her mood changing drastically from being nonchalant to overly concerned in the span of hours, I sensed how emotionally drained and stressed she was during this time of her recovery.

Participants' emotional responses following their concussion such as having feelings of frustration and irritability, as well as regular mood swings, all might have led to weight concerns for a few of these athletes. Specifically, three of the participants were concerned about weight gain or weight loss during their prolonged concussion recovery. For instance, Sonia explained:

I gained a lot of weight during my concussion recovery, which was hard because I felt like I was losing control. I wasn't eating right since my appetite changed during that time. Everything gets back to how I was feeling emotionally.

In contrast, Rebecca talked about the weight loss she experienced as well as its implications. She felt as though she had actually overcome her weight issues since her concussion, yet she was penalized for her efforts:

Physically, I lost a lot of weight after my concussion. I wasn't eating since I wasn't training nor sleeping well. Once I returned to play, I tried to compensate for not being able to train for several months, so I was in the gym all time! I lost even more weight. I lost 30 pounds! A few months later, I was selected on the National volleyball team. The coach was very pleased with my physical shape. The following year, when I joined the national team program once again, I had gained the 30 pounds that I had lost because of I wasn't well. The coach told me I was not in shape. The thing is I was actually healthier than the previous year. My brain was healthy and so my body had adjusted back to its usual weight. I gained weight because I felt better! It was so frustrating... That is when I realized that if you haven't lived a concussion, you don't understand how it can affect your body (Rebecca).

In addition to these altered moods and behavioural changes, three of the players talked about the depression symptoms they believed were a result of their concussion: "During my concussion, I became very depressed because I lost interest in most things, like school" (Sonia).

I found that my concussion took the biggest toll on me emotionally. Before my concussion, the smallest thing could make me smile. But all the things that I knew would usually make me happy and put a smile on my face didn't work. I could try as much as I

wanted to make myself happy or pretend that I was, but nothing worked. There was nothing to look forward to or plan for. I couldn't have goals or plan to return to play. Not being able to see the end of this concussion was tough. I was so stale... Everything was kind of grey (Chantal).

The athletes' demeanour changed dramatically as they began sharing symptoms of depression. The conversation shifted from occasional joking and laughing to sad, reflective, and emotional reactions, which included moving some of them to tears. For example, I could sense Marie's vulnerability and uneasiness as she began to speak quietly and as her natural smile vanished. Despite the pain associated with resurfacing these difficult experiences, all three players felt compelled to share their stories to help future generations of athletes better understand the psychological responses of prolonged concussion symptoms.

One of the athlete's described her experiences with symptoms of depression that led to share a very personal and frightening personal experience. After discussing her depressive symptoms, Rebecca confessed her suicidal attempt three months following her concussion:

A few months after my concussion I attempted to commit suicide. I tried to commit suicide because I had just failed my fall semester in university. I didn't fail out of school, but I knew that I would never be able to make-up for my poor grades. I got two "D"s and I never had such grades in my life. Getting those grades also led to me getting kicked out of my program of study, which I had been working hard to get into in the first place... Things were horrible. School, my boyfriend, volleyball... Nothing was going well (Rebecca)...

While I saw the fear and hopelessness in her eyes as she talked to me, I also saw the strength she gained in overcoming such adversity. In fact, Rebecca credited her concussion experience for

leading her towards becoming a qualified youth worker in hopes of “giving a second chance” to others in need. After being diagnosed with a clinical depression a few months following her concussion, Rebecca sought help from psychologists and was medicated for nearly two years. At the time of the interview, she revealed she had overcome her depression and was no longer medicated. She seemed thrilled to have graduated from university and to be working with at-risk youth where she can share her experiences to encourage them in different aspects of their lives.

To conclude, this higher-order theme highlighted some of the participants’ emotional and behavioural responses following their concussion and throughout their prolonged recovery. These injury responses encompassed participants’ accounts of *frustration, irritability, mood swings, weight issues*, as well as *depression*.

### **Student-Athlete Concussion Aftermaths: “I failed everything”**

While athletes spoke about the emotional and behavioural responses following their concussion, they also described the unique outcomes and barriers that resulted from experiencing protracted concussion symptoms in a university setting. I interpreted these factors as losing their sport due to being isolated from their team, the lack of a definitive return date, the non-physical rehabilitation program, as well as the lack of knowledge concerning concussions. Moreover, these university athletes also revealed several academic issues as a result of suffering from protracted concussion symptoms, including reduced class attendance following their concussion, problems studying due to persisting symptoms, poor grades the semester they suffered their concussion, and a prolonged or changed academic path. These concussion aftermaths were significant factors in the athletes’ rehabilitation.

During their concussion recovery, all five athletes felt alone and removed from their respective sport for a significant amount of time throughout their concussion recovery. For

example, Julie and Chantal spoke about being disconnected from their team with an aggravated tone and look of despair:

I was pretty upset the first week after my concussion because I was really excited to start my rookie season. It was an exciting time and I got injured the second week in. It was pretty upsetting to get a concussion. I actually wasn't around the team for probably three weeks, which is an important time because you get to know everyone on the team. Then, a month after my concussion, I found the whole recovery process tough. I'm not the type of athlete who will sit out. It's hard for me to even miss a practice. Eight weeks or so after my concussion, it was extremely hard for me to still be out because I wanted to be with the team. I wanted to do everything my teammates were doing (Julie).

During my concussion, I couldn't go to the rink. The rink is my happy place. I study there, sleep there, chill there, even though it's so far from campus and out of the way. My teammates all go there, there is always someone there! I wasn't allowed at the rink so that was weird (Chantal).

Additionally, Rebecca explained the feeling of loss associated to being sidelined by a concussion in a university setting. For instance, Rebecca mentioned that "volleyball was my motive in university" and that a month following her concussion "not having volleyball in my life was enough to bring my morale to a complete zero". As I listened to Rebecca's comments and heard the sorrow and guilt in her voice as she shared her experiences, it made me reflect on my own sense of loss during my concussion recovery. Likewise, I also felt as though I had lost the most important aspect of my life, volleyball, and couldn't help but feel responsible for my injury and the consequences that stemmed from it.

Further complicating participants' feelings of loss, they felt the unique recovery process of concussions only exacerbated their emotional and behavioural responses during their recuperation. The unique factors associated to concussion recovery were evident in the discussions focused on feelings of isolation and the current recovery protocol, which requires complete cognitive and physical rest and lacks a fixed return date:

I was very bored during my concussion recovery. I didn't know what to do sometimes because I tried to stay off my laptop as the doctor suggested. At times I was staring at the four walls of my bedroom because I had nothing to do. It's a very boring recovery process (Julie).

I think that was the hardest thing for me during my concussion recovery, I was stuck in my own mind. Normally I am a strong mental person. But not being able to see an end to my concussion was tough... I couldn't have any goals or plan my return. There was nothing I could look forward to or plan for during my recovery (Chantal).

As noted in my reflective journal, I interpreted that the "static", non-physical, rehabilitation program, as well as an unknown return date exacerbated feelings of despair during athletes' concussion recovery. For these university athletes, being inactive and isolated from their sport appeared to be the worst possible situation when coping with their injury. I identified with these examples because the absence of exercise during my rehabilitation and the lack of a return date brought forth feelings of misery and despair.

Finally, a couple of the athletes also explained how concussions differed from other athletic injuries since they "are not visible to others" and cannot be cured by "simply taking a few Advils". In fact, Sonia admitted that her concussion could not be compared to any of her previous injuries:

My concussion recovery is not even comparable to other injuries because with any other injury it's that part of your body that is injured. It's your elbow, it's your knee, it's whatever. When it's your head, it's everything physical. If it's my knee, I can still bike, I can still do other things. With your head you can't do anything. So it's everything physical and it's every other part of your life as well that suffers. My concussion did affect me socially, it did affect me academically, emotionally, and in every other aspects of my life, which no other injury has.

While Sonia explained how her concussion was unique compared to her other injuries, it appeared as though she was holding back tears. At that moment, I was able to feel the dramatic impact the injury had on every aspect of her student life. Moreover, several athletes also recognized the importance of resting in order to facilitate their recovery from this unique injury.

Julie, Chantal and Rebecca shared the following examples:

No brightness, no computer screens and everything, which is the worst part of the recovery process. I would recommend an athlete not use their laptop. I know a few times I went on my laptop and I regretted it right away because my symptoms got worst afterwards (Julie).

When the doctors tell you 30 minutes of cellphone use or television per day, that truly is what they mean! If you decide to watch your full TV show that lasts an hour, you may wake up the next morning all messed up again. It really is all about staying isolated and resting fully. I would suggest staying in your room, no studying if you can. Lie down and eat when you can to keep your energy up (Rebecca).

As Julie, Chantal, and Rebecca provided specific examples of how to take the appropriate rest following a concussion, I interpreted their suggestions as a reflection of their personal

experiences. It was evident from their firm tone of voice that these athletes dealt first hand with the negative consequences of not following the recommended rest and recovery measures for concussion symptoms and wanted to make sure others did not follow their footsteps.

Along with losing their ability to play their sport and concussions' unique injury recovery, four of the athletes revealed that part of their struggle during recovery stemmed from a lack of knowledge regarding concussions. Some of the participants mentioned how their friends, teammates, and family members did not understand their concussion recovery process: "During my concussion recovery, I had to tell some of my friends to leave me alone and explain to them over and over again why I wasn't able to do certain things such as going out" (Marie). Similarly, Julie felt as though her teammates did not understand the return-to-play process:

I obviously felt pressured by my teammates to get back to hockey during my recovery, even just to go to practices and even through stages of return to play. Sometimes I would just throw the skates on and my teammates would just assume that I was going to practice and it was hard to say no, that I would only be skating. My teammates were always asking when I would come back. One half of the team had a good understanding about how long it would take me to get back to hockey and the other half was basically saying, "When are you coming back, when are you coming back?". They didn't really understand concussions and the return-to-play process.

It was clear from Julie's tone of voice that her teammates' lack of understanding surrounding concussion recovery did not facilitate her return-to-play process and brought forth feelings of frustration. Likewise, Rebecca also admitted to feeling frustrated by her teammates not understanding that her concussion was the cause of her many mood swings while Sonia was annoyed by her parents believing she was simply "absent minded" rather than unable to retain

information. I interpreted that these athletes felt very misunderstood during their recovery, which may have been challenging for these athletes who were trying to cope and manage their protracted concussion symptoms. Finally, a couple of the athletes noted they lacked knowledge about concussions symptoms and the dangers associated to returning to play while symptomatic:

I Googled “concussions” because I was curious to see if some of my behaviours were related and because I was wondering what was happening to me. No one had given me any information regarding the injury. The information is not out there, it’s not like: “This is what can happen, this is what you can feel like.” It’s more like: “You’re going to have a headache, you will feel nauseous”. It’s the physical symptoms that we are aware of, not the mental stuff. After I Googled information, it made me feel better, it was reassuring (Marie).

With concussions, there will always be a way to cheat and athletes will always lie about their symptoms. Even if athletes think they are not concussed. Because like I said, I thought I was doing myself a favour by going back on the ice while symptomatic and doing the right thing. I believed myself and I told myself that I was making the right decision. In the beginning, I knew I was lying to doctors about my symptoms, but it became my reality and I did not know the consequences (Sonia).

Listening to Marie and Sonia’s lack of knowledge about concussions and how it negatively affected their concussion recovery were instrumental moments documented in my journal logs. It was startling to hear university athletes acknowledge the need for concussion education. During the interviews, I could not help thinking about my concussion experiences and how fortunate I was to be a graduate student that researched the psychosocial aspects of concussions. It helped

me realize how fortunate I was to have access to informational support regarding concussions from my research supervisor and lab mates.

In addition to describing the uniqueness of concussions, all of the athletes revealed several academic issues, including reduced class attendance, poor grades, and a prolonged or altered academic path, as a result of suffering a concussion in a university setting. First and foremost, participants discussed the effect their concussion had on their class attendance. Due to the severity of their symptoms, all five of the athletes did not attend class the first week following their concussion:

When I was in school during that Winter semester after having suffered my concussion, I would try not to go to two classes in one day since I couldn't focus for more than 10-15 minutes without getting migraines. If I had two separate blocks, I would go to one half of one class and then go to the afternoon class (Sonia).

Moreover, some athletes also spoke about the difficulties they faced once they returned to class:

I tried to go to school, but at times I would only go to half of my class time because my symptoms would worsened so quickly. I could see my semester failing and volleyball slipping away from me... (Rebecca).

Rebecca's comments made me reflect on my own class experiences and the difficulties I encountered following my concussion. For example, I missed the first month of classes following my concussion because my cognitive symptoms were too severe to even attempt to study. I could also relate to her as I felt my grades and teammates slipping because I was away from my university life for more than a month.

Once these athletes made their return to school, most of them revealed their daily struggles with studying. In fact, they believed the struggles they encountered stemmed from their

protracted concussion symptoms. For example, Julie described her concentration in class as “just not being there” and admitted, “When you’re a concussed student-athlete, it’s really tough to keep up with your classes”. Moreover, Rebecca felt she could not maintain focus and retain information for “classes that demanded a lot of studying such as biology and anatomy”. Rebecca further explained:

I remember during my concussion recovery, I would have my blinds closed in my room with just a dim light on. When I would study, it would only be for half an hour and then I would have to close my books for another half an hour to relax and do nothing. Then, I would try and start over (Rebecca).

Likewise, Marie also described the ways in which her study habits changed as a result of her concussion:

During my concussion, I would do work for an hour at a time and take breaks in between. I had to change my study habits. Things were done slower. I couldn’t just sit down and work on a lab report for six hours straight (Marie).

As athletes spoke about missing class time and their struggles studying during their concussion rehabilitation, it is not surprising that four participants also explained how their grades were adversely affected during this time period:

I couldn’t focus in my classes. I tried to get tutors at that time, but I think I had missed too many classes already. I failed two of my classes. The only class I passed was because I knew the content really well before coming to university (Julie).

The session I had my concussion, I had a ‘D’ average. I even dropped one of my classes since I was overwhelmed. So, I was enrolled in three total classes. I failed two of my classes so I felt the pressure of having to get top grades the following semester (Rebecca).

I remember I got a C- but I was just absolutely thrilled and I've gotten A+ my whole life so... When I was happy about getting a C-, that is when realized how much my life had changed since my concussion. Then I tried taking a summer class to make up for the math class that I failed during my concussion. However, since I didn't know I was still concussed at that point and I actually failed that math class again... (Sonia)

It was evident that discussing poor grades was a challenging topic for these athletes as they had disappointed facial expressions and appeared embarrassed to share information in regard to their weak academic performance.

Lastly, managing protracted concussion symptoms while being a full-time university student negatively affected four of the athletes' academic path, as athletes discussed the repercussions of poor grades due to their protracted concussion symptoms. For example, Julie and Sonia said they "failed several classes", which forced both athletes to "stay at school during the summer to take classes". Sonia also shared that she is still feeling the effects of her concussion "because I can't transfer out of my program since my GPA is too low... [which] screwed me for my whole university life". Furthermore, as Julie shared her personal experiences, I heard the disappointment in her voice and witnessed her frustration when she shook her head and added:

I seriously thought about withdrawing from school that semester after I suffered my concussion. I was talking to my mom about dropping out of university for the semester. I wasn't doing well in school at the time because of my concussion. I wasn't able to focus. It was the beginning of the school year and I could still drop my classes without it being a problem. I tried to stick it out, but it didn't work out so well...I was taking just three classes that semester. I think I am going to be catching up with my academics because of

the concussion I suffered my first year. I am now behind one semester. I will probably have to add another year onto my program. I'll be here for six years (Julie).

In addition, one participant felt her academic path drastically changed because of her ongoing concussion symptoms:

My protracted concussion symptoms affected my academic progression. There is one reason why I am not a physical education teacher and that I am a social worker. That is because I was accepted into physical education under condition that my GPA would be at least a B-average. It was not an issue until I suffered my concussion. During my recovery, I made the mistake of not dropping out of school for the semester. As a result, I failed two courses. Then I was kicked out of the program. I had to reassess my whole future and transfer into the social work program. I didn't withdraw from school because that would have meant I would have had to stop playing volleyball too. I didn't want to lose volleyball; it meant the world to me. Looking back now, I should have dropped out of school and stopped playing for a semester...

I interpreted that her anxiety for dropping out of university was related to her fear of losing her athletic identity. I identified with her feelings of anxiety and fear because I had to withdraw from university my first semester of graduate school due to my persisting concussion symptoms. At the time, I was at a loss without volleyball and embarrassed to withdraw from university due to an injury that was so misunderstood by my teammates.

To summarize, athletes shared some of the obstacles they faced as a result of suffering from protracted concussion symptoms in a university setting. For instance, athletes spoke about the unique factors associated to concussion recovery including losing their sport due to being isolated from their team, lack of return date and the non-physical rehabilitation program, as well

as the lack of knowledge concerning concussions. Furthermore, participants described some of their academic repercussions, such as reduced class attendance the first month following their concussion, difficulty studying due to their concussion symptoms, and poor grades. Athletes also mentioned the negative impacts their concussion had on their academic path, as some of the athletes were forced to take an extra semester or were dismissed from their respective study programs.

### **Network of Support: “The support for me was the biggest thing”**

Throughout their concussion recovery, athletes spoke about the importance and need of social support to facilitate the rehabilitation process. Individuals who provided various types of emotional, tangible, and informational support to the athletes during their concussion recovery were interpreted as their “network of support”. These individuals encompassed coaches, doctors, athletic therapists, teammates, partners, parents, and roommates. This higher-order theme describes athletes’ perceived and preferred support from these particular individuals.

First and foremost, the athletes felt their coaches played a prominent role in the provision of informational and emotional support to them. Several players explained how their coach “would send me text messages on a daily basis” to see how “I was feeling” and to “ask me questions concerning my sleeping patterns and symptoms”. One of the players further explained her unique relationship with her coach throughout her rehabilitation; “He was like a ‘nanny’ to me during my recovery. He was always there for me. He helped me find a psychologist to speak to ” (Rebecca). As Rebecca explained how thankful she was for her coach’s support provision and constant understanding with a soft smile, I sensed how big of an impact he played in guiding her to full recovery, which was noted in my reflective journal. In addition, athletes also described

some of the ways in which their coaches supported them, including appointment follow-ups and accepting the concussion recovery protocol:

My coach was the one who told me I shouldn't be around the rink during my concussion recovery. He told me to take a break and that it wasn't good for me to be there. My coach was really good about letting me take time to do absolutely nothing. It made me feel like I could take the time off. Doctors were telling me to take the time off so it helped that my coach agreed as well (Chantal).

My coach was very understanding throughout my recovery. My coach knew to let me take my time to get better from my concussion. He would run by the assistant athletic therapist to ask if I was okay to start doing certain drills in practice. He made sure I respected the different steps of the concussion return-to-play protocol, which was good. (Marie).

Personally, I found it very helpful during my concussion recovery for my coach to be involved through every process. Every time I would have a doctor's appointment, I would come back to the athletic complex because my coach wanted to know everything that was going on. My coach talked to our athletic therapist on a daily basis to see how I was doing. He was really helpful and is really like a 'parent' to me (Julie).

When Julie described the relationship she built with her coach during her recovery, the spark in her eyes explained how important his support was to her when she was going through such a severe injury while living away from home. I believe the care and concern given by most of these athletes' coaches facilitated their prolonged recovery process. Based on my conversations with these athletes and my personal experiences, I expect that having your coach believe in the

recovery process of concussions as well as providing constant emotional support could only be beneficial to one's protracted concussion rehabilitation.

Aside from coaches, athletes also highly valued the social support they received from their athletic therapists. For example, Chantal and Marie explained how they enjoyed the informational support they received concerning concussion and its unique recovery process:

The athletic therapist was super informative. I am the kind of person who likes to understand her body. I don't like going in blind and not understanding. My athletic therapist would explain things to me and also answer my questions concerning concussions (Chantal).

My athletic therapist gave me graphs that showed how I might think I am doing better one day, but that I might drop back down. She made me understand what I needed to do to get better. After my appointments, I felt great! I felt so much better (Marie).

As I listened to Chantal and Marie's experiences with their athletic therapist, it became clear to me that as university athletes, these two individuals were very in-tune with their bodies and wanted to understand the complexity of their injury. Therefore, having a professional who gave them additional information about concussions seemed comforting for these two athletes.

Moreover, Sonia also detailed the unique relationship she developed with her athletic therapist following her concussion:

I became really close to my athletic therapist. We became "family". She was the only person who supported me throughout my whole concussion recovery. Everyone else would support me for a bit and then they wouldn't understand, which I understand because I didn't even understand myself. My athletic therapist saw through my bullshit at the beginning of my concussion recovery. She knew right off the bat that I was lying

about my concussion symptoms. I knew with the look she gave me that I couldn't lie to her. I guess after that I just told her the truth about everything and she really helped me from there. If I didn't have my athletic therapist during that time, I would have been completely lost. She really took care of me with everything (Sonia).

The conversation I had with Sonia relating to her athletic therapist was a turning point I recorded in my journal logs. When she tried to explain her athletic therapist's role throughout her concussion recovery, Sonia broke down in tears. As Sonia apologized and attempted to gather herself, her feelings of compassion and gratitude for her athletic therapist continued to overwhelm her. At that particular moment in time, it became evident to me that she was more than her athletic therapist; she was also her confidant.

Athletes also discussed the ways in which parents provided support during their concussion recovery. Regardless of the distance, several athletes described how helpful it was to keep in touch with their parents during their recovery process:

My parents were the most supportive during my concussion recovery. My parents live pretty far away so I would talk to them on the phone almost every day. They understood what I was doing through. My mom would always tell me not to rush back to hockey and that I knew myself best. She would also tell me that everything would be there when I would return to hockey. My parents would just listen... I would rant to them. I would cry to them... Having my parents ready to listen to me was helpful (Chantal).

It was hard because I lived quite far from home, but I would talk to my mom every other day and she would ask me about my concussion and how everything was going. My mom is a nurse. Anytime I would have questions concerning concussions, I would text my mom. She would try to get me through the whole recovery process. (Julie).

Chantal and Julie spoke about their parents and the support they were given during their prolonged recovery with great appreciation. Both athletes emphasized how valuable and relieving it was to be understood by their parents and to have their continuous support throughout the different phases of their concussion recovery and during the return-to-play process.

Since university athletes spend a majority of their time with their teammates, all five of the athletes discussed how their teammates responded to their concussion, including the ways in which they provided support. Having said that, a few of the athletes also described some less effective means of support from their teammates:

During my concussion, my teammates would tell me that I didn't look well or that I didn't look like myself. I had to tell them not to tell me that I didn't look like myself. But as soon as I did, they stopped right away (Chantal).

I obviously felt pressured by my teammates to get back to hockey during my recovery. Sometimes I would just throw my skates on and my teammates would assume that I was going to practice. It was hard to say no, that I would only be skating. They were always asking when I would come back. One half of the team had a good understanding about how long it would take me to get back to hockey and the other half was basically "when are you coming back?" and didn't really understand the concussion and the return-to-play process. I told those teammates what I had to do in order to come back to hockey. I told them that I would rest for two more weeks, then bike and work my way up (Julie).

It was clear from Chantal and Julie's tone of voice that they were annoyed by their teammates' lack of concussion knowledge. I echoed their comments as I also struggled with teammates who unknowingly pressured me to return to play and who did not understand the recovery

process of concussions. Now that I have reflected on my experiences, I do not blame my teammates for their lack of understanding since I believe it stemmed from their lack of concussion knowledge. Additionally, I suppose the pressure I felt to return to volleyball was my teammates' attempt to recognizing my role was still important for the team's success. On the other hand, a few of the athletes shared their preferences for social support:

My teammates would talk to me about funny times we had or things to look forward to.

They would also send me motivational quotes. It's the little things that helped (Chantal).

My teammates would come visit me during my concussion recovery for an hour or so and then they would leave. They were somewhat understanding that I couldn't interact with them for long periods of time... (Julie)

Finally, these athletes' network of support also comprised doctors, roommates and partners. First, some of the athletes expressed that they enjoyed the informational support they received from doctors:

My doctor wrote me a note and told me not to go to practices and that I needed to rest fully. He explained to me that for the next two weeks, I needed stay home and to do what didn't bother my symptoms in order to heal my concussion (Chantal).

Secondly, as most of these athletes lived away from home during their university years, roommates played a crucial role throughout their concussion recovery. Four of the athletes mentioned how having teammates as roommates was very helpful since "they would check on me", "keep my updated with what was going on with the team", and "knew I had a concussion so I didn't have to go home and explain what was going on". In fact, Julie strongly believed that, "If I lived with someone else that was not an athlete during my concussion recovery, they wouldn't have quite understood that much about the injury and the recovery process." Lastly,

two of the athletes detailed the difficult times they faced with their significant other during their prolonged recovery:

My concussion affected my relationship with my boyfriend. We would always argue. To use his exact words, he thought I was “unbearable”. He was one of my roommates at the time and we didn’t stop fighting. I had so many mood swings and he didn’t know how to handle them. He tried to support me, but he didn’t have the tools. It wasn’t his fault, it was my concussion’s fault... It was “me”. I tried to make things better and so did he, but it just wasn’t working (Rebecca).

For my boyfriend, my concussion recovery was hard because I was depressed and he had to deal with that. You know, what can you do with someone who’s concussed? I couldn’t do anything so he got bored and it was just really hard for him to handle that for a while (Sonia).

Rebecca and Sonia were aware of the burden their concussions created for their boyfriend, although it was not clearly articulated whether this awareness came after months of reflection or was perceived at the time of their concussion. In fact, both athletes seemed to feel guilty for the relationship issues they faced.

Finally, in addition to revealing their network of support, all five athletes self-reflecting on their own experiences and discussed the importance of social support in facilitating the prolonged concussion recovery of university athletes:

Concussions suck! It’s a hard recovery process to try to go through and it’s great having people trying to help you to go through it. If you’re alone, it would be even worse. I think having support helped me to get back to hockey faster. The biggest thing for me was to have people around me, helping me. I would recommend to an athlete suffering from a

concussion who lives far away from their family to talk to their parents. It's very tough, but I talked to my mom almost every day (Julie).

During concussion recovery, an athlete needs words of encouragement, such as a simple text message. It always feels great to know that your team has not forgot about you, since you are so isolated during the recovery process. It's always nice to know that your teammates are thinking of you and messaging you (Rebecca).

These athletes' comments regarding social support made me reflect on my own recovery experiences. In fact, a significant part of my positive prolonged recovery experience is related to the provision of social support from my peers and family members. I strongly believe that the emotional and informational support I received helped me overcome adversity.

To conclude, athletes detailed their network of support, which included coaches, doctors, athletic therapists, teammates, partners, parents, and roommates. Athletes discussed their preferences for social support, such as daily check-ins from coaches, parents and roommates, as well as informational support and emotional support from medical personnel. Moreover, the participants described what they felt were ineffective forms of social support, including disagreements with their partners, being questioned by teammates about their return to play date or being told by teammates that they did not look well. Finally, all of the athletes disclosed the importance of social support in the recovery from protracted concussion symptoms.

## Chapter 5

### Discussion

The purpose of this study was to provide an in depth description of female university athletes' lived experiences with protracted concussion symptoms. Specifically, this phenomenological study provided a qualitative account regarding the effects of prolonged concussion recovery on university athletes' injury responses, academics, and social support provision. Three higher-order themes emerged from the data: *concussion injury responses*, *student-athletes' concussion aftermaths*, and *network of support*. In this chapter, each of these themes will be discussed as they pertain to previous research.

#### Concussion Injury Responses

The current study provides information on the emotional sequelae of female athletes who suffered from protracted concussion symptoms in the context of university sport. Athletes' emotional and behavioural responses involved descriptions of frustration, irritability, mood swings, depression, and weight issues. While the participants' injury responses varied in intensity and timeframe, they all stemmed from psychosocial factors associated to prolonged concussion recovery, including isolation, indefinite return date, lack of a physical rehabilitation program, and lack of knowledge about concussions. This section will discuss these injury responses in relation to previous literature.

A growing body of literature has found a connection between concussions and emotional sequelae in collegiate athletes (e.g., Covassin, Elbin, Larson, & Kontos, 2012a; Mainwairing, Hutchison, Bisschop, Comper, & Richards, 2010; Solomon, Kuhn, & Zucherman, 2015; Vargas, Rabinowitz, Meyer, & Arnett, 2015; Yang, Peek-Asa, Covassin, & Torner, 2015). However, little attention has focused on investigating the factors that may influence emotional responses in

collegiate athletes with concussions. For example, Mainwaring and colleagues (2010) reported that university athletes with concussions have significant changes in depression and total mood disturbance post-injury, yet the causes of the emotional upheaval were not provided. While the athletes in the current study detailed their emotional responses, the qualitative framework also allowed the participants to elaborate on *how* their prolonged recovery affected their emotional disturbance. For example, athletes said they felt frustrated and irritable due to the lack of a return-to-play date and the loss of athletic identity as a result of being removed from their sport environment for over 10 weeks. These factors are both known to be primary components of an athlete's response to sport injury (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998).

Specifically related to their prolonged recovery, players explained that the unexpected and sudden return of concussion symptoms during their return-to-play process aggravated their feelings of frustration and despair, and led to difficulties coping with their injury and time away from sport. In addition, athletes explained that their feelings of frustration and mood swings were aggravated by the prescribed physical and cognitive rest, which socially isolated them from school and sport, and by teammates' lack of understanding surrounding concussion's return-to-play process. These results are among the first to provide a detailed description of the many factors that contribute to a university athletes' emotional upheaval when symptoms of a concussion persist beyond the average two-week time frame.

In addition to contending with frustration and irritability, participants in this study also experienced symptoms of depression, which is consistent with recent sport concussion research (Caron et al., 2013; Kontos & Elbin, 2016; Kontos, McAllister, & Reynolds, 2015; Mainwaring et al., 2010; Moore, Sauve, & Ellemberg, 2015; Vargas et al., 2015). For example, Kontos and colleagues' prospective study showed a significant increase in depression 14 days post-

concussion for collegiate athletes, suggesting that depression may become prevalent when recovery time is prolonged. The current findings contribute to concussion literature by providing a rare empirical account of collegiate athletes who described symptoms of depression they endured as a result of their protracted concussion symptoms (i.e., recovery <10 weeks). As research has shown, depression is known as a modifying factor that may predict the potential for prolonged concussion symptoms (McCrory et al., 2013) and three athletes in this study specifically explained the perceived causes of their depression symptom during their extended recovery. For instance, participants believed their symptoms of depression stemmed from feelings of hopelessness associated to their isolation from university academics and sport for more than 10 weeks. Moreover, athletes' persisting concussion symptoms increased the uncertainty of their return-to-play date. Although much remains to be explored, the current findings provide an account of the root causes of symptoms of depression in collegiate athletes suffering protracted concussion symptoms. These results suggest that these athletes should be considered a vulnerable group and may benefit from interventions aimed to prevent and/or reduce post-concussion symptoms of depression (Kontos & Elbin, 2016).

Furthermore, findings from this study disclosed that one participant attempted to commit suicide as a result of battling depression. Correspondingly, a recent longitudinal study indicated that adults who suffered a concussion had an increased long-term risk of suicide compared to the population norm (Fralick, Thiruchelvam, Tien, & Redelmier, 2016). While there have been some examples of concussed professional hockey and football players who had suicidal thoughts (e.g., Caron et al., 2013; Gulli, 2011), there are limited empirical accounts of collegiate athletes who reported suicidal ideation or attempts. In the current study, the participant cited her loss of athletic identity, the associated isolation from her sport, and her poor performance in school as

the reasons that led her to attempt suicide the semester she suffered her concussion. Fortunately, this athlete also revealed that the support and medical assistance she received from her psychologist helped her overcome her depression and suicidal ideations, as well as encouraged her to share these thoughts and experiences with at-risk youth. As such, the current study findings add to the existing literature and warrant consideration from individuals working with collegiate athletes to ensure that professional counselling is given to individuals experiencing protracted concussion symptoms as they may have suicidal ideations and could benefit from the close monitoring of mental health practitioners (Kontos, McAllister, & Reynolds, 2015).

Finally, in response to their emotional upheaval, participants in this study also revealed struggling with weight issues (e.g., either significant weight gain or loss), which are predominant behavioural concerns among healthy female collegiate athletes (Meyers, 2015). Previous qualitative research surrounding NCAA athletes' responses to sport injury has postulated that recovery is a dynamic process, whereby emotional and behavioural responses reciprocally influence each other and are affected by personal factors throughout rehabilitation (e.g., Clement, Arvinen-Barrow, & Fetty, 2015; Madrigal & Gill, 2014). For example, Clement and colleagues (2015) found that NCAA division II athletes' emotional and behavioural reactions following injury were influenced by several prominent personal factors, including injury severity and recovery status, which is consistent with the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998). Although their study highlighted personal factors that induced specific emotional and behavioural responses during injury recovery, it did not include collegiate athletes who had suffered a concussion. Results from the present study disclosed that their feelings of depression, frustration, and regular mood swings led to significant weight gain or loss during their prolonged recovery, which is in line with previous athletic injury research that implied

athletes' emotional responses triggered their behaviours. In addition, athletes associated their weight fluctuations to psychosocial factors of concussions, such as the lack of a physical rehabilitation program and concussion symptoms curving their appetite. Taken together, these results extend our understanding of prolonged concussion injury by specifying the psychosocial factors that influenced athletes' emotions, which in turn affect their behavioural responses. Therefore, these findings appear to suggest that collegiate athletes suffering from protracted concussion symptoms may benefit from increased monitoring throughout their recovery as their prolonged static rehabilitation program and concussion symptoms may have serious weight implications that could hinder their recovery process.

In summary, this section highlighted the athletes' emotions and behavioural responses throughout their recovery, most notably their feelings of frustration, irritability, mood swings, and depression, as well as weight issues. These injury responses were influenced by the psychosocial factors of concussions, including the lack of a return date and feelings of loss due to being isolated, which further highlights the dynamic process of sport injury rehabilitation (Wiese-Bjornstal et al., 1998). Finally, participants' emotional sequelae suggests that collegiate athletes suffering from protracted concussion symptoms are a particularly vulnerable population and may benefit from professional counselling (Caron et al., 2013; Kontos, McAllister, & Reynolds, 2015; Littleton & Guskiewicz, 2013; Safai, 2003) to help monitor mental health disorders (e.g., disordered eating and depression) and, ultimately, improve concussed athletes' well-being during their prolonged recovery.

### **Student-Athlete Concussion Aftermaths**

Aside from the emotional and behavioural responses experienced following their concussion, the university athletes also faced numerous academic issues, which included reduced

class attendance the first month following their concussion, difficulty studying, and poor grades. Furthermore, some athletes were forced to take an extra semester or were dismissed from their respective study programs as a result of failing grades. This section will discuss these academic issues as they relate to previous literature.

In recent years, researchers have recognized that athletes recovering from concussions may face academic challenges in the days and weeks following their injury (Broglia, Collins, Williams, Mucha, & Kontos, 2015; Wasserman, Bazarian, Mapstone, Block, & van Wijngaarden, 2016) due to the cognitive impairments associated to concussions (Kontos, Covassin, Elbin, & Parker, 2012; McCrory et al., 2013). For example, Kontos and colleagues (2012) revealed that collegiate athletes with concussions manifested neurocognitive impairments in the weeks following their injury, such as poor visual and verbal memory, and slower motor processing speed. Correspondingly, concussion research has widely recommended cognitive rest (i.e., limiting activities requiring concentration and attention) due to increasing evidence that returning to school while experiencing these cognitive difficulties can exacerbate symptoms and lead to poor academic performances (Broglia et al., 2015; Halstead et al., 2013; Howell, Osternig, Van Donkelaar, Mayr, & Chou, 2013; Porter, Constantinidou, & Marron, 2014; Moreau, Langdon, & Buckley, 2014). For instance, Moreau and colleagues' (2014) investigation of four NCAA Division I athletes' experiences with an in-season concussion revealed that participants had difficulty taking notes in class and lower test scores the semester they suffered their concussion. Although Moreau and colleagues' (2014) qualitative study highlighted some of the academic difficulties collegiate athletes may experience following a concussion, their sample included both male and female athletes with protracted and non-protracted symptoms (i.e., 7 to 19 day-long recovery). The results of the current study also revealed that female CIS collegiate

athletes faced academic issues during their prolonged concussion recovery which included reduced class attendance the first month following their concussion, trouble concentrating in class, difficulty studying, and poor grades. The phenomenological approach of the current study helped provide further insight into the academic issues athletes may face during a prolonged recovery by allowing participants to elaborate on *how* their academic performances were affected by their protracted concussion symptoms. More specifically, while all five athletes stayed enrolled in school during their recovery that lasted a minimum of 10 weeks, two participants disclosed that the lack of academic accommodations and their self-imposed pressure to maintain their pre-injury academic standing (i.e., high grades; Heller, Bloom, Neil, & Salmela, 2005; Gibson, Nigrovic, O'Brien, & Meehan, 2013) further challenged their ability to perform in school during that time. These findings extend previous literature by indicating that university athletes suffering from protracted symptoms may be more at risk of poor academic experiences than athletes with non-protracted symptoms, as they must manage their academic demands and concussion symptoms for an extensive amount of time. Therefore, the current results suggest that higher education institutions could provide academic support to both athletes with protracted and non-protracted concussion symptoms, but should also consider providing tailored academic accommodations that meet the needs of athletes whose recovery extends beyond the normative two-week time frame. Correspondingly, it can be suggested that university athletic programs consider forming a multidisciplinary concussion management team (McCrory et al., 2013; Halstead et al., 2013), which may include the collaboration of coaches, academic support staff, team physicians, courses instructors, and disabilities services, to support and maximize student-athletes' potential for academic achievement during prolonged concussion recovery (Broglio et al., 2015; Chinn & Porter, 2016).

While researchers have investigated the impact of concussions on student-athletes' cognitive abilities, (Gibson, Nigrovic, O'Brien, & Meehan, 2013; Moreau, Langdon, & Buckley, 2014;), little is known about the long-term academic consequences of suffering from protracted concussion symptoms in a university setting (McCrory et al., 2013). In fact, following their study concerning the effects of cognitive rest on American high-school students who suffered sport-related concussions, Gibson and colleagues (2013) suggested that a prolonged concussion recovery may involve additional consequences for student-athletes as their schoolwork accumulates while at the same time feeling removed from their sport. The current results build on the existing literature by detailing the long-term consequences of a prolonged concussion recovery on collegiate athletes' academic progression and vocational goals. For example, while none of the participants withdrew from university the semester they suffered their concussion, three of the athletes revealed they regretted their decision of staying enrolled in school since their grades suffered significantly. More specifically, two participants disclosed having to take an extra semester after failing several classes, and one participant revealed being dismissed from her program as a result of her poor grades. Presumably, these long-term academic ramifications would negatively affect athletes' quality of life (WHOQOL Group, 1995), as academics are one of the primary life domains relevant to college students' appraisal of their social environment (Harju & Bolen, 1998; Piebes, Gourley, & Valovich Mcleod, 2009). While it was outside the scope of the current study to determine the level of quality of life among participants, the current findings suggest that athletes' ongoing academic aftermaths may have led to lower ratings of their quality of life if they had completed a questionnaire measuring this topic. For instance, two participants noted that in addition to losing their athletic identity, they also lacked a sense of achievement in their academics because they felt further away from fulfilling their vocational

goals due to their altered academic paths. Although much remains to be explored, these results indicate that careful monitoring of collegiate athletes' academic standing as well as guidance in their decision-making process concerning academic withdrawal may be needed during prolonged concussion recovery.

To summarize, this section highlighted the academic issues collegiate athletes experienced during their prolonged recovery, which included reduced class attendance, difficulty studying, and poor academic performance, which in many cases affected their long-term career plans. Therefore, these findings suggest that professionals, such as coaches and sport psychology consultants, need to be aware of the academic issues university students may face during their prolonged concussion recovery and should collaborate with academic support staff, course instructors, and student disability services to provide academic accommodations and resources to facilitate a successful physical and cognitive recovery (Chinn & Porter, 2016; Hall et al., 2015).

### **Network of Support**

In addition to detailing the academic issues female collegiate athletes may face while suffering from protracted concussion symptoms, this study also provides information on the social support network of these athletes throughout their prolonged recovery. Each athletes' network of support was different, and included any combination of coaches, doctors, athletic therapists, teammates, parents, and roommates. This section will discuss the athletes' perceived and preferred forms of support during their prolonged concussion recovery.

To date, a large amount of athletic injury research has supported the value and impact of social support as an important means of coping during the rehabilitation period (e.g., Bianco, 2001; Clement & Shannon, 2011; Yang, Peek-Esa, Lowe, Heiden, & Foster, 2010; Wiese-Bjornstal et al., 1998). Specific to concussion rehabilitation, researchers have also found that

concussed athletes seek support from several sources, including family, friends, athletic therapists, doctors, coaches, and teammates (Caron et al., 2013; Covassin, Crutcher, Bleecker, Heiden, Dailey, & Yang, 2014; Moreau et al., 2014). For example, Covassin and colleagues' (2014) survey-based study investigated the sources of support of NCAA male and female collegiate athletes during their recovery from non-protracted concussion symptoms and found athletes relied on a combination of family, teammates, athletic trainers, coaches, and physicians for social support. Although Covassin and colleagues' investigation highlighted NCAA athletes' network of support during a normative concussion recovery of less than two weeks, their results did not provide information on *how* individuals in their social network provided support. While the athletes in the current study also identified a similar network of support, the methodology allowed the participants to detail their preferences for social support during their recovery as well as the ways in which they relied on specific individuals. For example, all of the participants enjoyed the daily check-ins they received from coaches, parents, or roommates, as well as the concussion knowledge they acquired through the informational support provisions of medical personnel and athletic therapists. In particular, two participants appreciated the information they received from their doctors regarding the importance of taking complete cognitive and physical rest in order to heal their concussion. Correspondingly, two athletes disclosed that their limited concussion knowledge left them ill-prepared to handle the emotional sequelae of concussions, and as such, expressed extreme gratitude towards their athletic therapists for the additional information they provided concerning the complex recovery process of protracted symptoms (e.g., unpredictable return of symptoms) and the mental health implications of concussions (e.g., depression). Contrary to previous research suggesting that athletes suffering from a concussion rely less on athletic therapists for support (Covassin et al., 2014), the current findings indicate

that athletes may receive a substantial amount of informational support from their athletic therapists because they often lack concussion knowledge. Given that very little research has explored the supporting role of athletic therapists in the management of concussions, these results extend existing literature and in turn suggest that athletic training programs should consider delivering concussion education to ensure that professionals in this field are equipped with the latest concussion knowledge since they may be a primary source of concussion information for athletes with concussions. Correspondingly, our findings regarding the supporting role of athletic therapists further support the latest position statement for National Athletic Trainers on concussion management, which posited that athletic therapists should be disseminating concussion information to individuals involved in the care of athletes, including coaches, parents, medical professionals, and athletes themselves (Broglia et al., 2014). Furthermore, the current results offer a thorough understanding of the importance each individual plays in athletes' support network, and may ultimately help ensure that the appropriate form of support is delivered since these individuals may be better informed of their unique roles as social support providers during the recovery process of athletes with protracted concussion symptoms.

Of the individuals that encompassed athletes' network of support, participants in the current study noted that their coaches played a prominent role in facilitating their prolonged concussion recovery process, which is in line with previous concussion symptom-reporting research (e.g., Baugh, Kroshus, Daneshvar, & Stern, 2014; Kroshus, Kubzansky, Goldman, & Austin, 2015). For example, Baugh and colleagues' (2014) survey-based study on concussion reporting in NCAA collegiate football players showed that higher levels of perceived coach support for concussion symptom-reporting was linked with significantly less undiagnosed

concussions and with returning to play while experiencing symptoms less often (Baugh et al., 2014). Similarly, results from the current study indicated that perceived coach support eased participants' prolonged recovery process since coaches adopted a caring, parental role as most of the collegiate athletes' lived away from home. More specifically, four of the participants revealed that having a coach that emphasized the importance of taking cognitive and physical rest following their concussion, who was concerned and cared for them emotionally and physically, and created a safe environment by reinforcing the importance of following the concussion recovery protocol had a positive influence on their overall recovery. These current findings are also consistent with recent research on athlete-centered coaching (Cassidy, 2013; Caron, Bloom, & Bennie, 2015; International Sport Coaching Framework, 2013). For instance, Caron and colleagues (2015) found that Canadian high school coaches felt their role with concussions involved prioritising athletes' health and well-being over winning in competitions. Correspondingly, athletes in the current study seemed to suggest that their coaches recognized their role in fostering the growth of the whole person (Bennie, 2011; Falcão, Bloom, & Gilbert, 2012), since they went beyond simply focusing on athletes' performance in competition (Caron et al., 2015) by providing emotional and informational support to these athletes who were sidelined by injury. Evidently, the current findings add to the literature by suggesting that collegiate coaches not only play a primary role in creating team cultures that value concussion symptom-reporting and concussion safety behaviours (e.g., Baugh et al., 2014; Kroshus et al., 2015), but also in reinforcing the concussion recovery protocol (McCrory et al., 2013) and providing emotional support throughout concussion recovery given that they have more contact with athletes than their families who often live far away. Furthermore, these results suggest that coaching education programs should continue to teach proper concussion management and

should consider emphasizing the importance of coaches who focus on athletes' health, safety, and well-being (Caron et al., 2015), as they may play an instrumental role in athletes' network of support during concussion recovery.

Finally, participants in the current study also detailed the emotional support they received from teammates during their prolonged concussion recovery, which is in line with previous athletic injury literature (Bianco & Eklund, 2001; Corbillon, Crossman, & Jamieson, 2008; Rosenfeld, Richman, & Hardy, 1989). For example, Corbillon and colleagues' study (2008) investigated CIS injured athletes' perceptions of the type of social support provided by their coaches and teammates and concluded that teammates provided significantly more emotional support than coaches. While Corbillon and colleagues' quantitative study explored collegiate athletes' perceptions of teammates' social support provisions during injury recovery, researchers have yet to explore this particular social relationship in regard to collegiate athletes and concussions. In the current study, two participants reported that they received positive emotional support from teammates, which included receiving motivational quotes via text messages, sharing funny memories and stories with each other, and at-home visits when athletes were not able to come to the athletic facility due to their concussion symptoms (i.e., aversion to light and noise). On the other hand, two participants expressed some forms of emotional support provided by their teammates that they felt were less effective, such as being asked about their return to play date or being told that they did not look well (i.e., athletes did not look like "themselves"). These interactions often left them feeling misunderstood and created additional pressure for these athletes to return to play. In particular, one athlete disclosed being bothered by her teammate's lack of concussion knowledge, whereby she deliberately set time aside during her recovery to explain the return-to-play process in order to prevent more questions from her teammates. While

teammates appear to play an important role in the provision of emotional support during athletes' prolonged concussion recovery, these findings also seem to suggest that teammates may need special guidance concerning concussion recovery to ensure they deliver the most effective and appropriate form of support to athletes suffering from concussions. Furthermore, given that participants felt their teammates did not understand their injury, collegiate athletes suffering from concussions may benefit from university support groups, which have been proven to be particularly valuable to athletes with concussions (Horton, Bloom, & Johnston, 2002). More specifically, Horton and colleagues (2002) investigated the impact of support groups on the psychological state (i.e., anger, depression, anxiety, and isolation) of elite athletes experiencing concussions and found that attending support groups improved athletes' psychological state scores. Although Horton and colleagues' study was undertaken at a time when concussions were not as well understood as they are today, the current study findings seem to provide further evidence for their claim that support groups may benefit athletes with concussions since it would allow them to feel less alone and to share concerns and coping ideas to help deal with the demands of recovery with other athletes who are also experiencing this unique injury.

In summary, this section cited the social support network of collegiate athletes suffering from protracted concussion symptoms, including coaches, physicians, athletic therapists, teammates, parents, and roommates, as well as participants' preferences for social support from these particular individuals. In addition to detailing their network of support, all of the athletes stressed the importance of social support in facilitating the challenging prolonged concussion recovery process, which is consistent with the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998). In fact, Wiese-Bjornstal and colleagues' model (1998) suggests that social support is both a situational variable that influences athletes' emotional and

behavioural responses during the rehabilitation process and a coping resource that can ultimately impact the injured athlete's physical and psychological recovery outcomes. Correspondingly, participants revealed that the emotional support provided by coaches, parents, roommates, and teammates, in combination with the informational support received from doctors, athletic therapists, and coaches had a positive influence on their experiences with prolonged concussion recovery. As such, results from the current study propose that individuals in athletes' network of support must be aware of their role as social support providers as they are key players in easing their prolonged recovery process. Finally, despite being satisfied with the different forms of social support they received throughout their recovery, athletes emphasized how challenging it was to suffer from protracted concussion symptoms in a university setting, and as such, felt compelled to share their experiences in hopes of helping future generations of athletes who may face with this unique phenomenon.

## **Chapter 6**

### **Summary**

The sixth and final chapter of this thesis will provide a summary of the study, which includes an overview of the participants, procedures, data analysis, and the main conclusions. Subsequently, practical and theoretical implications will be identified, as well as limitations and recommendations for future research.

Researchers have estimated that 1.6 to 3.8 million concussions occur each year (Langlois, Rutland-Brown, & Wald, 2006), with the majority of them occurring in sport (McCrory et al., 2013; Marshall et al., 2015). In recent years, sport-related concussions reached an epidemic level and are now widely regarded as a serious public health issue. Concussion symptoms typically resolve within a short 7 to 10 day period (McCrory et al., 2013). Unfortunately, 10% to 20% of athletes experience protracted symptoms that are accompanied by a combination of physical and psychological sequelae that can last from months to years (Caron, Bloom, Johnston, & Sabiston, 2013; Guskiewicz et al., 2011), which can impact athletes' personal lives in a variety of ways. The purpose of this study was to provide an in-depth understanding of female University athletes' experiences with protracted concussion symptoms. Specifically, this study identified female athletes' emotional and behavioural responses, academic issues, as well as their perceived and preferred support while suffering from protracted concussion symptoms in a university setting.

Upon receiving approval from the McGill Research Ethics Board, five athletes were purposely recruited based on four selection criteria. First, they were all Canadian Interuniversity Sport (CIS) athletes on an interactive sport team within the last two years under the same head coach. Second, they experienced protracted concussion symptoms for a minimum of eight

weeks. Finally, they had all received medical clearance and returned to sport/activity prior to their interview. Data were collected using semi-structured, open-ended interviews. The research team created an interview guide that was informed by literature on concussions, athletic injury rehabilitation, and social support provision during the injury recovery process. The interviews ranged from 41 to 70 min and were audio-recorded and transcribed verbatim.

The current study implemented an Interpretative Phenomenological Analysis (IPA), which allows researchers to utilize their experiences to develop knowledge through interpretations to better understand social and psychological phenomena (Smith, Flowers, & Larkin, 2009). More specifically, IPA emphasizes the dynamic interpretative process, in which participants try to make sense of their experiences and the primary researcher attempts to make sense of the participants' experiences through their similar experiences (Smith et al., 2009). Correspondingly, IPA was selected as the methodology for our study as the lead author is a former elite female CIS athlete who also experienced protracted concussion symptoms. Smith and colleagues' (2009) guidelines for IPA analysis were followed and three higher order themes emerged from the analysis: *concussion injury responses*, *student-athletes' concussion aftermaths*, and *network of support*. *Concussion injury responses* included participants' emotional reactions and maladaptive behaviours that were a result of their prolonged concussion recovery. This higher order theme also included psychosocial factors that influenced athletes' emotional and behavioural responses. *Student-athlete concussion aftermaths* pertained to outcomes and barriers that were a result of athletes experiencing protracted concussion symptoms in a university setting. More specifically, this higher order theme included the academic issues athletes' faced as well as the psychosocial factors that are specific to concussion recovery and uncommon with rehabilitation from other injuries. Finally, *network of support*

discussed individuals who provided various types of emotional and informational support to the athletes throughout their concussion recovery. In particular, athletes described their perceived and preferred support from their network, which encompassed coaches, doctors, athletic therapists, teammates, partners, parents, and roommates.

Although each athlete had different experiences, many similarities existed among the participants. For instance, all athletes identified and detailed the emotional and behavioural injury responses they experienced as a result of their protracted concussion symptoms. These responses ranged from frustration, irritability, mood swings, and for some, depression and weight issues. Participants agreed these responses stemmed from feelings of isolation, an indefinite return date, a non-physical rehabilitation program, and their own lack of knowledge about concussions. Furthermore, each participant described the academic issues they faced due to their prolonged concussion recovery, including reduced class attendance, difficulty studying, which for several athletes led to poor grades and changes in their academic paths. Finally, all of the participants agreed that social support played a crucial role in easing the prolonged concussion recovery process. In sum, results from the present study provided the first qualitative account regarding the effects of prolonged concussion recovery on female collegiate athletes' injury responses, academics, and social support provision. This in-depth understanding of the emotional and academic implications of suffering from protracted concussion symptoms as well as the social support needs of athletes during recovery can provide individuals such as coaches, medical professionals, and sport psychology professionals with information that can enhance their applied work with this population, and ultimately, facilitate athletes' recovery process. In particular, monitoring athletes' psychological disturbances and providing academic guidance

during recovery can potentially prevent emotional sequelae and help athletes in coping with the challenging concussion recovery process.

## **Conclusions**

- The participants reported suffering from protracted concussion symptoms for 10 to 18 months.
- All athletes described the emotional responses they experienced as a result of their protracted concussion symptoms, which included frustration, irritability, mood swings, and depression.
- Three athletes spoke about the symptoms of depression they experienced as a result of being isolated from their team and their indefinite return-to-play date.
- Of the participants who talked about symptoms of depression, one athlete said she attempted suicide three months following her concussion due to losing her athletic identity, being isolated from her sport and teammates, as well as poor academic performance that stemmed from her persistent symptoms.
- Two athletes said their regular mood swings altered their personalities and influenced some poor decision-making, such as choosing not to write a final exam before fully considering consequences of the decision.
- Three athletes spoke about having significant weight gain or loss. More specifically, athletes felt their weight issues were associated to their physical concussion symptoms, their emotional sequelae, and the lack of physical activity during the rehabilitation process of their concussion.
- All players detailed the psychosocial factors of concussions they felt worsened their recovery process, which included feelings of loss due to being isolated from their team

for a significant amount of time, the lack of a definitive return date, the non-physical rehabilitation program, and their teammates as well as their own lack of concussion knowledge.

- The participants felt the psychosocial factors of their concussion exacerbated their emotional and behavioural responses throughout their recovery.
- Three athletes explained how concussions differed from other athletic injuries because physical and psychological symptoms of concussions are invisible and affected them physically, academically, socially, and emotionally.
- Three athletes talked about the importance of listening to doctors and taking complete cognitive rest following a concussion, such as staying away from computers and not watching television, in order to facilitate the recovery of this unique injury.
- Four athletes revealed part of their tumultuous recovery stemmed from a lack of knowledge regarding concussions, whereby teammates, friends, family, and even themselves did not fully understand the concussion recovery process.
- All athletes detailed the academic issues they faced, including reduced class attendance and poor grades.
- Each of the athletes spoke about the daily challenges they faced when returning to school following their concussion, which included inability to concentrate in class and difficulty retaining information.
- One of the athletes revealed it took more time for her to complete school assignments after her concussion, which was worsened by taking constant breaks during her study sessions because her symptoms would resurface.

- The four athletes who spoke about their poor grades also explained that these results negatively affected their academic path. Specifically, athletes who struggled in school were forced to enrol in a summer semester or to stay for an additional year to make up for their poor grades.
- All athletes said their coach played a prominent role in the provision of informational and emotional support during their concussion recovery.
- Two athletes communicated frequently with their athletic therapist and highly valued the informational support they received about the recovery process (e.g., unpredictable return of symptoms) and the mental health implications of concussions (e.g., depression).
- One of the athletes who talked about her athletic therapist's social support provision explained that she also became her confidant during her recovery.
- Two athletes appreciated the information they received from their doctors regarding the importance of taking complete cognitive rest in order to heal their concussion, as they did not have this concussion knowledge prior to their injury
- Two athletes said it was helpful to speak to their parents on a regular basis during their recovery process, regardless of the distance, as they said they enjoyed hearing about their parents' daily activities rather than talking about their own concussion issues.
- All participants expressed that teammates were influential in their concussion recovery.
- Two athletes reported that they received positive emotional support from teammates, which included receiving motivational quotes via text messages, sharing funny memories and stories with each other, and at-home visits when athletes were not able to be in an athletic facility due to their persisting concussion symptoms.

- Two athletes expressed some ineffective forms of emotional support provided by teammates, including being questioned about their expected return to play date or being told that they did not look well. Athletes also added that these interactions left them feeling misunderstood and created additional pressure for them to return to play.
- Four of the athletes felt having teammates as roommates was helpful since it kept them informed about the team.
- All five of the athletes reflected on the importance of social support in their recovery.

### **Practical Implications**

Previous research on university athletes' experiences with concussions has primarily focused on the short-term effects of the injury, or has been acquired through the use of quantitative research methods. Using a qualitative approach, participants in this study were able to use their own language to share their experiences and feelings with prolonged concussion recovery. In particular, the athletes detailed the types of emotional (e.g., frustration) and behavioural responses (e.g., weight issues), academics issues (e.g., poor grades), and social support needs they encountered as a result of their prolonged concussion recovery. The results of this study add to an ever-evolving body of literature on concussions by providing unique insights about female university athletes' experiences with a prolonged concussion injury.

The current study has several practical implications that could benefit athletes, coaches, parents, and post-secondary institutions. Moreover, the current findings may enhance the ability of athletic therapists, sport psychology professionals, as well as medical professionals to better assist and provide support for athletes who suffer from protracted concussion symptoms. The current results are of interest to individuals involved in all competitive levels of sport, including athletes, coaches, and parents, to better understand the effects of protracted concussion

symptoms. In particular, teammates and coaches may be more aware of their roles as providers of social support by learning about the lived experiences of collegiate athletes with a prolonged concussion recovery. For example, participants said they valued coaches who cared about their health and who emphasized the importance of taking cognitive and physical rest. Therefore, these results provide evidence of the importance of educating coaches about concussion as well as holistic coaching practices. As such, coaching education programs should consider delivering concussion education and emphasizing the importance of athletes' well-being and growth development, as coaches may play a key role in reinforcing the concussion recovery protocol and in creating a safe and supportive environment for athletes. These findings may also encourage athletes and coaches to reinforce concussion safety behaviours, which would create a safer sporting environment centered on athletes' health and well-being. Similarly, results from this study may help parents to better understand how protracted concussion symptoms can impact athletes' emotional states and academic lives. For instance, athletes in the current study disclosed symptoms of depression that seemed associated to their poor grades and altered academic paths. This information suggests that parents may need to monitor their child's emotional state and academic progression closely when concussion symptoms extend for prolonged periods of time (i.e., beyond two weeks).

In addition to benefitting those directly involved in sport, this study may equally benefit individuals who care for injured athletes, such as athletic therapists. For instance, participants revealed they enjoyed the informational support concerning concussion recovery they received from their athletic therapists, which suggests that athletic therapists should be informed of their important role in providing social support to concussed athletes and given training on how best to facilitate concussion knowledge transfer for these athletes during recovery and return-to-play.

Correspondingly, athletic therapists could be well positioned within the varsity team environment to deliver concussion education at the beginning of every season (Broglia et al., 2014). Furthermore, since athletes in this study talked about their feelings of frustration that were aggravated by the prescribed physical rest during their concussion rehabilitation, athletic therapists should consider gradually increasing physical activity levels of these athletes, which is in line with recent research on postconcussion for athletes with persisting concussion symptoms (e.g., Baker et al., 2012; Kurowski et al., 2016; Leddy et al., 2010). For example, although more studies are needed to verify and generalize findings, results from a recent randomized clinical trial on adolescents who sustained a mild traumatic brain injury and had between 4 to 16 weeks of persisting symptoms suggest that active rehabilitation programs (i.e. subsymptom aerobic training) may potentially benefit individuals suffering from protracted concussion symptoms (Kurowski et al., 2016). Although research concerning active rehabilitation protocols of concussions is limited, findings appear to suggest that athletes who experience symptoms for a prolonged amount of time (i.e., > 2 weeks) may benefit from “a progressively intensive exercise protocol”, which may be important for medical professionals and athletic therapists to consider when working with this unique population (Broglia, Collins, Williams, Mucha, & Kontos, 2015, p. 4).

Similarly, participants in this study discussed the emotional sequelae of suffering from protracted concussion symptoms, such as feelings of frustration and depression, which appears to suggest that increased monitoring of affective symptoms is needed during athletes’ prolonged concussion recovery, and in some cases, referral to a medical specialist (e.g., psychiatrist, neurologist) may be required (Kontos, Deitrick, & Reynolds, 2015). In addition, the current results also suggest that academic institutions should consider having peer support groups for

college students suffering from concussions, as these peer support groups have been found to be beneficial in coping with this unique injury (Horton, Bloom, & Johnston, 2002). Furthermore, these findings also advocate the value of the sport psychology professional (SPP) in the multi-disciplinary team approach to the prevention and management of athletes with concussions (Johnston et al., 2004; Littleton & Guskiewicz, 2013; Kontos & Elbin, 2016). For example, the SPP could maybe help monitor and assist athletes during their concussion recovery by administering psychological skills training strategies, such as SMART goal setting, positive self-talk, relaxation, and imagery. These strategies have been effective during recovery from other injuries and could potentially help athletes in coping with their emotion during the challenging concussion recovery and may also provide them with an opportunity to actively influence their rehabilitation. Furthermore, as the SPP could play a consulting role within the multi-disciplinary concussion management team, SPP may benefit from tailored concussion education and training in clinical psychology in order to better assist these injured athletes.

Moreover, participants in this study discussed the numerous academic issues they faced, which included difficulty studying, poor grades, and altered academic paths. These results appears to concur with results from other studies that have suggested the multi-disciplinary concussion management team should also involve academic support staff, course instructors, and student disability services to maximize student-athletes' potential for academic achievement during concussion recovery (Broglia, Collins, Williams, Mucha, & Kontos, 2015; Chinn & Porter, 2016). More specifically, post-secondary institutions should consider providing academic support and individualized academic accommodations (e.g., extensions to complete their assignments and examinations, delayed testing or project due dates; Broglia et al., 2015) for athletes whose recovery extends beyond the normative two-week time frame. Likewise, the

multi-disciplinary concussion management team should clearly allocate the roles that each professional will play in supporting a student-athlete's academic needs during concussion recovery (Hall et al., 2015). For example, academic support staff could potentially consult with athletes suffering from protracted concussion symptoms and provide guidance in the decision-making process regarding course withdrawal when necessary. Moreover, as academic staff may need to provide support and accommodations to students suffering from concussions, post-secondary institutions should consider providing concussion education training to their academic and administrative staff to ensure that these individuals have the knowledge and strategies to support and help students who are suffering from concussions.

Finally, these results could benefit athletes who are suffering or have suffered from protracted concussion symptoms. In line with previous concussion research (Caron, Bloom, Johnston, & Sabiston, 2013), participants in the current study revealed feelings of loss associated to being isolated from their sport. The current results may be particularly helpful to other athletes who are facing similar challenges with protracted concussion recovery, as they might find some level of comfort in knowing that they are not alone. Furthermore, as participants in this study explained the academic implications of suffering from protracted concussion symptoms, athletes may benefit from knowing this particular information and choose to reach out to academic support staff in order to avoid the negative consequences that participants experienced.

### **Theoretical Implications**

The results of this study also extend the current body of literature on concussion rehabilitation by providing support for the use of the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) in better understanding the unique recovery process of concussions. The original integrated model (Wiese-Bjornstal et al., 1998) posits that recovery is

a dynamic process, whereby emotional and behavioural responses reciprocally influence each other and are affected by personal and situational factors throughout rehabilitation (e.g., Clement, Arvinen-Barrow, & Fetty, 2015; Madrigal & Gill, 2014). Results from the present study appeared to be consistent with the model, as the athletes disclosed feelings of depression, frustration, and regular mood swings led to weight gain or loss during their prolonged recovery. Furthermore, athletes associated their injury responses to the psychosocial factors of concussions, such as the lack of a return date and feelings of loss due to being isolated, which further highlights the dynamic process of sport injury rehabilitation (Wiese-Bjornstal et al., 1998). Finally, participants also revealed that social support, which is a situational factor in the integrated model, played a significant role in facilitating their recovery from protracted concussion symptoms. Taken together, these results suggest that Wiese-Bjornstal and colleagues' (1998) model could be used as a framework to better understand the role of concussions' affective symptoms and psychosocial factors in the recovery process. Correspondingly, Wiese-Bjornstal, White, Russell, and Smith (2015) proposed a concussion version of the integrated model in hopes of better understanding the roles of psychological, psychiatric, and psychosocial factors that affect athletes' responses and recoveries from concussions. This adapted model provides a framework that merged existing findings regarding psychological risk factors, postinjury psychological response and rehabilitation processes, and postinjury psychological care components, which could in turn afford researchers and health professionals with an evidence-based foundation to assist their future research and applied work. Given the infancy of this adapted concussion model, future concussion studies should use theory-driven approaches with this particular framework to explore athletes' recovery experiences.

## **Limitations and Recommendations**

Although the current study enhanced the overall understanding of female university athletes' experiences with protracted concussion symptoms, a number of limitations should be acknowledged when interpreting these results. First, although athletes' prolonged recovery experiences had many similarities, the duration of protracted concussion symptoms varied among participants from 10 weeks to 18 months. Future research should consider investigating the recovery experiences of athletes with different time frames, including those that lasted longer than 18 months. Second, the length of CIS playing experience differed among participants in our study from one season to as many as five years. It is possible that athletes who have less experience at the CIS level may reflect and interpret their prolonged concussion experiences differently than athletes who have many years of experience with the same CIS team and coach. Athletes with more years of experience may have stronger ties to their team and a greater sense of athletic identity, which could make their injury recovery period more challenging. Third, findings from this study were based on one data source, and thus did not include teammates, family members, and coaches. For example, participants indicated that coaches played a prominent role in the provision of social support, which implies they may have a different perspective on athletes' experiences with concussions. As such, future studies may consider collecting data from other people in collegiate athletes' lives to help gain a more thorough understanding of their experiences with a prolonged recovery. Finally, the results of the current study may only be applicable to collegiate athletes in Canada and the CIS. Other studies may want to explore university athletes' experiences in other countries, such as the National Collegiate Athletic Association (NCAA) in the United States.

Given the uniqueness of the study sample and that qualitative concussion research has just begun, future studies are encouraged to continue investigating athletes' experiences with protracted concussion symptoms. For example, future studies could investigate collegiate athletes who were forced to retire prematurely from sport as a result of suffering from protracted concussion symptoms. Collegiate athletes in the current study experienced physical and psychological symptoms of concussions for a prolonged period of time, which adversely affected their academic experiences and well-being. As such, it would be interesting to better understand the implications of a career ending concussion among collegiate athletes. For example, collegiate athletes who are forced to retire from university athletics prior to graduation may experience a difficult transition from sport because they invest a significant amount of time to their sport and have a strong athletic identity, which may have subsequent consequences on their academic and social lives (Alfermann, Stambulova, & Zemaityte, 2004; Caron et al., 2013; Grove, Fish, & Eklund, 2004).

The current study investigated the lived experiences of athletes with protracted concussion symptoms through the use of retrospective interviews. Although this method of data gathering was useful in providing a preliminary understanding of athletes' experiences with prolonged concussion recovery, it would be useful for future research to account for changes in athletes over time. For example, a longitudinal study may help gain a better understanding of the on-going effects of protracted concussion symptoms on athletes' emotional, physical, psychological, and social states, which may allow researchers to gain more knowledge surrounding prolonged concussion recovery. As such, future research is encouraged to use qualitative methodologies such as a longitudinal cohort study that would monitor a group of individuals suffering from concussions over time.

Furthermore, results from the current study also indicated that concussions adversely affected collegiate athletes' academic experiences. More specifically, findings revealed that athletes' grades and academic progression were negatively affected by their prolonged concussion recovery, which undoubtedly increased their feelings of anxiety and further challenged their recovery process. Therefore, it would be interesting for future studies to implement tailored academic accommodations to assist these collegiate athletes suffering from protracted concussion symptoms and investigate the types of academic support and resources athletes found helpful. For instance, researchers could develop a mixed-method study that would involve implementing an academic support program for collegiate athletes with concussions. More precisely, the academic support program intervention could consist of providing academic accommodations as well as academic counselling during concussion recovery. Furthermore, the quantitative data could provide an object measure to test the effect of the academic support program on student-athletes' emotional state, while the qualitative data (i.e., focus group interviews) would allow student-athletes to use their own words to describe their academic experiences, academic support preferences, and to describe their perceptions of the intervention. This line of research could provide insights on effective coping during concussion recovery that can help address academic issues for athletes suffering from protracted concussion symptoms.

Finally, although the current study expanded a growing body of literature on the emotional and behavioural responses of concussions, much remains to be explored concerning the affective symptoms following concussions. For instance, research could investigate the efficacy of behavioural interventions, such as university concussion support groups, and the role of social support and coping during concussion recovery. More specifically, researchers could use a mixed method design, analyzing both survey data on student-athletes' mood states and

quality of life before randomization and at the follow-up time point after the intervention, as well as individual semi-structured interview data of athletes' perceptions of the intervention.

Moreover, future research could investigate which factors of prolonged concussion recovery are predictors of behavioural responses. For example, researchers may explore whether physical symptoms (e.g., headaches) or psychological factors (e.g., depression and isolation from sport) are indicative of the type and intensity of behavioural responses of concussions (e.g., eating disorders and suicide). Results of this research could provide information that could enhance the concussion management of athletes and perhaps help reduce negative injury responses of concussions. Although much remains to be explored to fully understand sport-related concussions, the current study provided a preliminary investigation into the lived experiences of collegiate athletes who suffered from protracted concussion symptoms.

In conclusion, as collegiate athletes suffer from protracted concussion symptoms in a university setting, they experience a number of challenges including emotional sequelae and several academic issues that can be facilitated with provisions of social support. Given the high rate of concussions in collegiate athletics as well as the serious health implications of concussions, it is important to keep moving forward with this line of research to better understand how athletes cope with this injury in hopes of providing an optimal recovery environment that is supportive of student-athletes' needs and lays a foundation for successful cognitive, physical, and psychological recovery.

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## Appendix A

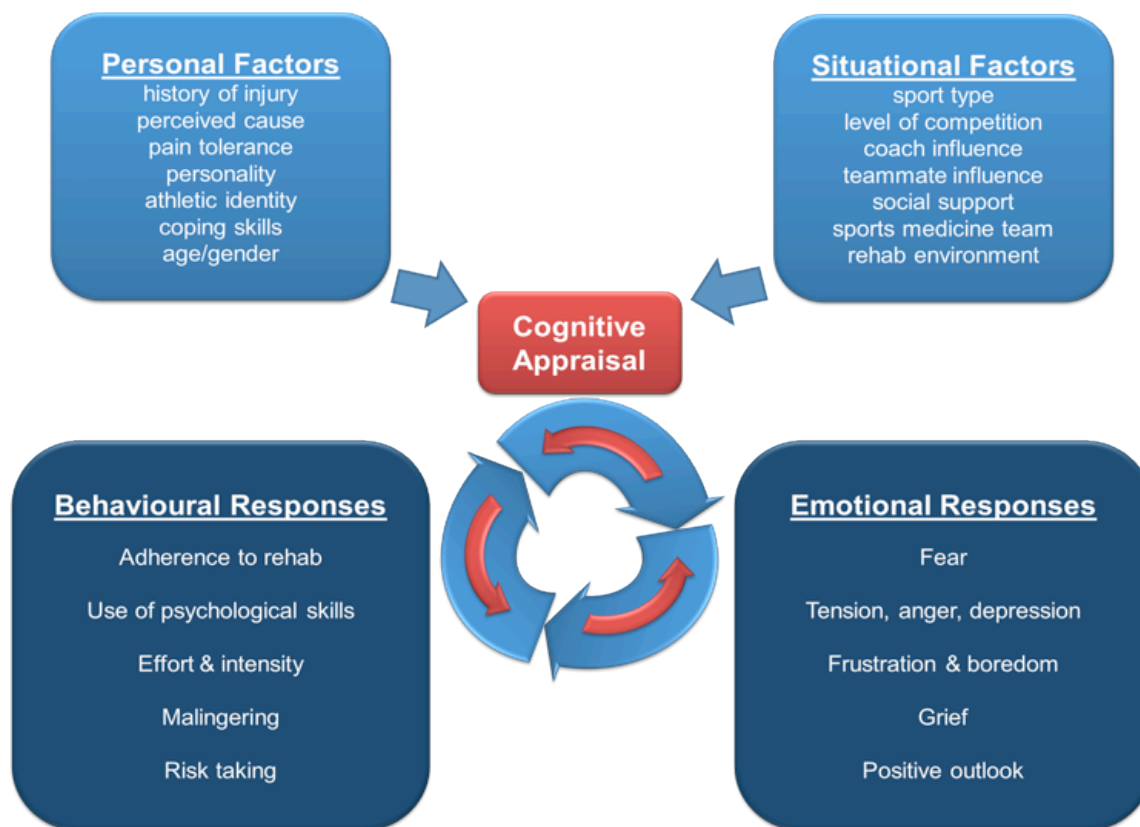
*Constructs that help define the nature of concussive head injury*

Number	Construct
1	Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an “impulsive” force transmitted to the head.
2	Concussion typically results in the rapid onset of short-lived impairment of neurologic function that resolves spontaneously.
3	Concussion may result in neuropathologic changes but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.
4	Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course; however it is important to note that in some cases symptoms may be prolonged

(McCrory et al., 2013)

## Appendix B

### The Integrated Model of the Response to Sport Injury



(Adapted from Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998)

## Appendix C

### Recruitment Script – Coaches

Dear coach \_\_\_\_\_,

My name is Daphnée André-Morin and I am currently working towards a Master of Arts degree in sport psychology under the supervision of Dr. Gordon Bloom in the Department of Kinesiology and Physical Education at McGill University. My supervisor and I are conducting a research study on the experiences of female athletes who suffered from protracted concussion symptoms. We would like your assistance in recruiting participants for our study. That is, we request that you forward the attached invitation to any athletes who have played on your team for at least two years and who suffered a concussion in the last two years, and whose symptoms persisted for at least eight weeks.

Should you have any questions concerning this study, please contact my supervisor or myself using the information provided at the bottom of the page. Additionally, please feel free to read the attached letter that was prepared for your athlete.

The McGill Sport Psychology Research Laboratory has a history of producing influential research on concussions. Please visit our website if you would like to learn more about our research: <http://sportpsych.mcgill.ca>.

Sincerely,  
Daphnée André-Morin

Daphnée André-Morin, B.Ed.  
Master's Candidate, Sport Psychology  
Dept. of Kinesiology & PE  
McGill University, Montreal  
[Daphnee-maude.andre-morin@mail.mcgill.ca](mailto:Daphnee-maude.andre-morin@mail.mcgill.ca)

Or

Gordon A. Bloom, Ph. D.  
Associate Professor  
Department of Kinesiology and Physical Education  
McGill University, Montreal  
(514) 398-4148, ext 0516  
[gordon.bloom@mcgill.ca](mailto:gordon.bloom@mcgill.ca)

## Appendix D

### Recruitment Script – Athletes

Dear \_\_\_\_\_,

My name is Daphnée André-Morin and I am currently working towards a Master of Arts degree in sport psychology under the supervision of Dr. Gordon Bloom in the Department of Kinesiology and Physical Education at McGill University. My supervisor and I would like to invite you to participate in our research study examining the experiences of female university athletes' who suffered from protracted concussion symptoms. You have been identified as a potential participant based on criteria that highlighted your experiences with concussion symptoms as a University athlete.

If you chose to participate in this study, you will be asked questions about your recent concussion, with particular emphasis your recovery from protracted concussion symptoms. Your identity will be kept confidential at all times. Only the lead investigator, Daphnée André-Morin, and the faculty supervisor, Dr. Gordon Bloom, will have access to identifiable data. If you choose to participate, I will conduct a 60 to 90 minute interview with you at a time and location of your choosing. If more information is required, then a follow-up interview may occur.

This study has been reviewed and accepted by the McGill University Ethics Board, and any information you provide during this study will remain confidential. Should you have any questions concerning this study, please contact my supervisor or myself using the information provided at the bottom of the page. The McGill Sport Psychology Research Laboratory has a history of producing influential research on concussions. Please visit our website if you would like to learn more about our research: <http://sportpsych.mcgill.ca>.

Thank you for considering participating in this research project, and I look forward to hearing from you!

Sincerely,  
Daphnée André-Morin.

Daphnée André-Morin, B.Ed.  
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## Appendix E

### Informed Consent Form

This study is in partial fulfilment of the requirements for the degree of Master of Arts for Daphnée André-Morin, a graduate student in sport psychology in the Department of Kinesiology and Physical Education at McGill University. You are invited to participate in our research study titled, “An interpretative phenomenological analysis of university athletes’ experiences with protracted concussion symptoms”. Should you choose to participate in this study, you will be requested, without payment, to partake in a 60 to 90 minute audio recorded interview. During the interview, you will be asked questions about your most recent concussion, with particular emphasis on the provision of social support during your concussion recovery. If more information is necessary, then a follow-up telephone interview may occur.

At the end of the interview, you will have to opportunity to clarify any statements made during the interview, offer additional insights and comments, or ask the interviewer (Daphnée André-Morin) questions. You will also receive a typed transcript of the interviews, which may be edited at your discretion. Prior to publication, you will receive copies of the results and conclusions of the study. Your identity will **remain confidential at all times**. The principle investigator, Daphnée André-Morin, and the faculty supervisor, Dr. Gordon Bloom, will be the only individuals to have access to identifiable data. All data, including the audio file of the recorded interview and the digital copy of the consent form, will be securely stored in an encrypted folder on a password-protected computer for a period of seven years. Any paper copies will be converted to digital files and, promptly, destroyed. Pseudonyms will be used to label all digital files. All data will be destroyed seven years after the study ends. The information disclosed during the interview will remain confidential and will be used for publication purposes and scholarly journals or for presentations at conferences. Your name and identity will not be revealed at any time. The McGill Research Ethics Board has reviewed this study for compliance with its ethical standards. **Your participation in this study is completely voluntary and not mandatory. You are free to refuse to answer any questions or withdraw from participation at any time, without penalty, and all information gathered up to that point will be destroyed.**

After reading the above statement and having had the directions verbally explained, it is now possible for you to provide consent and voluntarily agree to participate in this research project based on the terms outlined in this consent form. You will be provided with a signed copy of this consent form for your records. You may refuse to continue participation at any time, without penalty, and all information gathered will remain confidential. Please contact the Research Ethics Officer at 514-398-6831, or [lynda.mcneil@mcgill.ca](mailto:lynda.mcneil@mcgill.ca) if you have any questions or concerns regarding your rights and welfare as a participant in this research study. Please sign below if you agree to participate in this study.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Researcher’s Signature

\_\_\_\_\_  
Date

I agree (*please check YES \_\_\_\_ or NO \_\_\_\_ and write your initials \_\_\_\_\_*) to the audio recording of the interviews with the understanding that these recordings will be used solely for the purpose of transcribing these sessions.

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## Appendix F

### **Athlete Background and Concussion History: “I knew something was definitely not right”**

This higher-order theme described the participants’ athletic history, including past injuries, with a particular emphasis on their main concussion from its onset (including the diagnosis) to the return to play process.

All five participants discussed their athletic progression. Each played competitive high school sports and identified themselves as varsity athletes, and how important it was for them to play on a university team:

It’s great for me to be a varsity athlete. I have played a sport since I was young and it’s amazing to carry it through university. A lot of people don’t get to play university sport so I’m pretty much taking it all in while I’m here (Julie).

I guess before coming to university, I didn’t realize how cool of an experience it would be. Looking back on it, it was the best five years of my life so far. Just being part of the team and a student-athlete was amazing (Chantal)!

Throughout their youth and university careers, all players encountered a variety of musculoskeletal and overuse injuries. In addition, three of the players suffered concussions prior to the main one which led to their protracted concussion symptoms. None of them said these previous concussions were more severe than their last one:

I did have a concussion in my grade 10 year when I got hit into the boards in hockey. I was sidelined only for a month. I also had another concussion before that playing hockey, but those concussions weren’t as bad as the concussion I suffered my first year at University (Julie).

All five of the players discussed how they sustained the concussion that led to

their protracted symptoms:

I was in front of the net and I got crosschecked from behind. I got whiplash when I got hit, then I hit my head on the ice. I got back up and then I went into the boards and hit my head during that same shift, so there were three impacts. My athletic therapist doesn't know which impact caused my concussion or if all the impacts did (Sonia).

I suffered my concussion during a blocking exercise. I was standing on a 10cm thick mat to give me more height at the net while blocking. I was practicing our swing block where synchronization is important. I have always had the tendency to block with my hands very far apart, because that is how I had been successful. It was the last ball of the exercise and the ball went through my hands. The ball hit me between my nose and forehead, around eye level. I fell on the ground and was extremely dizzy. I could hear everyone around me asking if I was okay, as if I was in an aquarium. I will always remember that moment... the feeling I had. I wanted my coach and teammates to stop talking. I was so dizzy and I had a horrible headache (Rebecca).

Concussions appeared to be rather frightening for these players because they were experiencing unfamiliar symptoms. Specifically, four of the players described the headaches they endured as a result of their concussions: "The first week after my concussion, when I would walk to school, I would get a headache, or as soon as I started to read and write and concentrate on anything, I would get an instant headache" (Marie).

After being diagnosed with my concussion, I started seeing an osteopath. She would massage my head and all the small bones to try and move them around. The idea was to reduce the tensions I had in order to minimize my headaches. Headaches are the toughest thing when you have a concussion. You always have a headache (Rebecca).

I had gotten used to the headaches during my concussion recovery. I didn't realize what it was like not to have a headache because I literally had a headache for a year. I didn't even know at that point if I had a headache or not because that became the norm (Sonia).

Moreover, two players described problems with their vision that occurred following their concussion: "The biggest problem for me was my vision. It was blurry and I was sensitive to light. I've actually seen another doctor for my eyes because they were kind of messed up after my concussion" (Julie).

A month after my concussion, I still wasn't feeling any better. I went to my athletic therapist back home and she gave me fake glasses to help me do homework and stuff. The glasses have tape in the middle and the tape blocks out something... So when I use my glasses, I don't even know how to explain it, but there is no crisscrossing of what you are seeing in the middle. If I put my glasses on, I could do homework no problem. I don't have headaches. It actually helped. I don't understand how, but it worked (Marie)!

One player also described a strange sensation after the concussion, which she referred to as feeling "cloudy and spaced out":

My body was in slow motion a week or so after my concussion. When I wanted to go and participate in the conversation, it had already passed. It took me longer to process things so that when I knew what I wanted to say it was too late and people had moved on and I would just sit there (Chantal).

The return to play process can be a challenging time period in an athlete's concussion recovery. In fact, when athletes discussed the return to play process, three players spoke about the return of symptoms, which forced them to take some more time away from the sport: "There

was a point when I came back to practice and took another two weeks off because my symptoms came back. It didn't go well" (Chantal).

After my concussion, it took me two months to get back on the ice. I think at six weeks I started to do the [return to play] steps to go back. I started with the bike and at point it was too much, so my athletic therapist and I had to wait a few more days for my symptoms to go away then I tried it again... After waiting a few more days to be symptom free, I did all the off-ice stuff and passed. Then when I went to go on the ice, everything became blurry because I couldn't focus on the puck and other things. Even just stick handling was blurry. So I waited a few more days to get back on the ice as recommended by the eye specialist I was seeing. (Julie)

Subsequently, during their return to play process, two players admitted to being disingenuous to medical personnel about their concussion symptoms in order to return to competition: "Even two months after my concussion, I would sometimes play with symptoms. In fact, sometimes I wouldn't practice during the week in order to be able to play on the weekend" (Rebecca).

Two weeks after my concussion, I received medical clearance to get back on the ice. I had a neuropsychology test and I passed it, and I don't know how I did it! Maybe because I said I was symptom-free. I basically said I had no symptoms... I completely hid my symptoms on purpose! I wasn't aware of the dangers of hiding my symptoms and going back to play too early. I thought it was good for me to get back on the ice. Both my parents would tell me not to lie about my concussion symptoms because it would affect the rest of my life and I really didn't understand the enormity of that (Sonia).

However, after having receiving clearance from a medical professional to resume playing, the participants described some of the fears associated to playing in competitions after having suffered a major concussion:

My first game back after my concussion, I didn't play the first half of the game and I only played the second half. I definitely didn't run as much as I should have. I was just testing the water to see what I could do. I wanted to see what was going to happen if I exerted myself too much (Marie).

My return to play was tough. It's tough because you train so hard for months, then you are out for two months or so with a concussion. I started playing progressively, but I wasn't performing like I was before my concussion. First, your reflexes are so off. You have none! So since you know you don't have any reflexes you are even more afraid of the ball and you try to avoid it. I would tell myself "You are so dumb! Play!", and then I would get frustrated at myself. It's a terrible time. (Rebecca)

Although all players returned to play after their protracted concussion, participants report continually suffering from effects of their concussion. Two players mentioned having difficulty focusing and reading: "Reading is getting better, but I still can't focus for very long... I still find myself zoning out and if I try to focus for too long at that point then I'll just have a migraine again" (Sonia), "I don't have symptoms anymore, but it is rare that I study with my computer because I get dizzy and can't focus. I have to print my documents or else it doesn't go well at all!" (Rebecca). In addition, P1 also mentioned some lingering symptoms, such as headaches, memory issues and difficulty "staying organized and managing stuff".

To summarize, all five participants described how strongly they identified with being a University varsity athlete. Moreover, all the athletes described the different circumstances that

led to the concussion that kept them out of their sport 10 weeks to 14 months. During their prolonged recovery, participants experienced symptoms that included headaches, vision problems, and “feeling in a cloud”. Additionally, some of the participants admitted to returning to play while still symptomatic while others discussed the fears that surfaced as they made their return to competition. Finally, although all five of the athletes have recovered from their concussion, they discussed some lingering side effects, such as difficulty reading and focusing while studying, memory issues, as well as a lack of organization and time management.

## **Appendix G**

### **Interview Guide**

#### **Pre-Interview Routine**

- Introduction
- Consent Form

#### **Demographical Information**

1. Briefly describe your athletic career.
  - a. How important is it to you to be a varsity athlete?
2. Apart from concussions, describe some of the injuries you experienced during your athletic career.
  - a. What role did your coaches and teammates play during your previous injury recovery?
  - b. If you experienced an athletic injury during your CIS career (other than your concussion), in what ways did you cope with your injury?
  - c. Describe the ways in which you were supported throughout your previous injury recovery.
3. Not including your most recent concussion, describe your concussion history (including diagnosed and non-diagnosed concussions).
4. For your most recent concussion, can you explain the diagnosis process?
  - a. Who diagnosed your concussion?
  - b. When and where was your concussion diagnosed?
  - c. Are any symptoms still present? If so, please describe the symptoms you are still currently experiencing.

#### **Key Questions**

5. After your concussion was diagnosed, can you explain how you felt the first week?
6. A month after your concussion was initially diagnosed, what were you thinking or feeling?
  - a. Did you notice a change in your emotions one month post-concussion? If so, can you please describe this change?
7. How did the concussion impact your daily life physically, emotionally, etc.?
  - a. How did you react to the concussion rehabilitation program (i.e., complete cognitive and physical rest)

8. Describe your coach's role throughout your prolonged recovery.
  - a. In what ways can coaches help athletes suffering from protracted concussion symptoms?
9. Did you feel that you were supported during the initial stages of and throughout your recovery?
  - a. If yes...
    - i. Describe some of the people who supported you throughout recovery (i.e., initial recovery, return to play).
    - ii. In what ways did these people support you?
    - iii. Were you satisfied with the support provided?
    - iv. Did you notice any changes in relationships with those closest to you?
  - b. If no...
    - i. What types of support would have been beneficial during your recovery?
    - ii. Did you notice any changes in relationships with those closest to you?

### **Summary Questions**

10. What major factors do you perceive facilitate good or bad concussion recovery?
11. If you were asked to provide an athlete suffering from prolonged concussion symptoms with advice for their rehabilitation process in the form of a list of do's and don'ts, what would your list include?
12. If you were asked to provide a support network of an athlete suffering from prolonged concussion symptoms with advice for their rehabilitation process in the form of a list of do's and don'ts, what would your list include?

### **Concluding Question**

13. Do you have any final questions or comments you would like to share?