Health & Fitness Journal of Canada

Volume 14 **December 30, 2021** **Number 4**

STUDENTS' CORNER

Concussions From a University Athlete Perspective: Are We Bridging the Gap?

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Abstract
This article comments on the importance for athletes to understand the seriousness of concussion and their consequences if not immediately recognized and managed. There is a large disconnect between general concussion knowledge and understanding among varsity level athletes and as more research about concussion is brought forth, improved education and awareness of concussions for university athletes must be considered. It is critical that university level sports teams take this issue seriously and have policies in place for the care of the athlete to avoid long term consequences. Through educational programs such as the Concussion Awareness Training Tool (CATT) for high-performance athletes, the provision of free eLearning modules and resources will allow for a better understanding among university-level athletes on the importance of concussions and how to manage their symptoms, including mental health challenges that may rise, as well as allowing for academic accommodations. **Health & Fitness Journal of Canada 2021;14(4):16-21**.
https://doi.org/10.14288/hfjc.v14i4.359

Keywords: Concussion, Recognition, Reporting, Mental Health, Education

Introduction

Global practices for diagnosing and treating concussions have changed dramatically over the last several decades (Eagle, Kontos, Collins, Connaboy, & Flanagan, 2020). Sport is the second leading cause of concussion (Langlios, Rutland-Brown, & Wald, 2006; Miyashita, Timpson, Frye, & Gloeckner, 2013), and the increased risk for student athletes must be evaluated and carefully considered to avoid long term consequences.

Although there are many definitions for concussion, the Concussion in Sport Group (CISG), defines it in their most recent 2017 consensus statement as a traumatic brain injury induced by biomechanical forces (McCrory et al., 2017), and goes on to list numerous common factors in identifying the presence of a concussion.

There is a large disconnect between general concussion knowledge and understanding among varsity level athletes that needs to be addressed (Eagle et al., 2020). In a vulnerable student population, severe underreporting of symptoms and a lack of proper training in varsity athletes can have a detrimental impact. This can lead to worsening conditions after a preceding head injury and more prolonged and pronounced effects. The importance of varsity athletes to promptly recognize and

report concussion symptoms is imperative to avoid any negative health outcomes that can arise as the result of this injury. Varsity athletes need to also know that they are not alone in this journey; with evolving research and a support system in place, they need to be reassured they will be okay.

Understanding of the seriousness of concussion in recent years

In the past, concussions were dealt with much differently than they are today. The mindset of many individuals was that a concussion was no more than "having had your bell rung...tough it out...and play through it." As the science around concussions has evolved, we now know that this frame of thinking is no longer acceptable and that concussions are in fact a brain injury (Jordan, 2013). As a result, many individuals, including medical professionals, have started to take this injury much more seriously. Over the past decade, a multitude of research has been done examining both the short and long-term effects of concussions, as well as finding a more standardized approach to concussion diagnosis, treatment and management (Eagle et al., 2020).

It wasn't until the first International Symposium on Concussion in Sport which was held in Vienna, Austria in 2001, that the discussion about improving guidelines and regulations for the diagnosis and treatment of concussion in sport began (Aubry et al., 2002). This conference involved the invitation of several experts in the field of concussion research at the time to address more specific issues and produce a more unified model for how to proceed with concussion diagnosis and treatment (McCrory et al., 2017). It was at this first symposium where a team of experts was formed, and now called the Concussion in Sport Group (CISG). Every four years, this group meets to review the evidence-based literature and provide updated guidelines and recommendations on the prevention, diagnosis, treatment and management of concussions. The most recent information from the 2017 Consensus Statement on Concussion in Sport is among numerous documents that are currently used across Canada as the gold standard for concussion care. (McCrory et al., 2017). Other evidence-based documents have also been developed and are being used in forming an approach to concussion diagnosis and treatment. This includes the Ontario Neurotrauma Pediatric and Adult Guidelines and position statements such as the Canadian Pediatric Society (Marshall et al., 2018). Many universities follow these guidelines or develop their own resources based on the current literature.

As time progresses, we are learning more and more about the intricacies of the brain and what new approaches should be taken in the recovery process. We have learned so much over the past decade, but we still have a long way to go. For example, we need a better understanding on why individuals respond and recover differently, why a seemingly minor impact results in months of recovery in one individual while a significant impact on another individual results in no symptoms whatsoever.

Importance of Reporting

Many have heard the story of Rowan Stringer, a 17-year-old high school student who died in 2013 as a result of Second Impact Syndrome (SIS), a condition in which a blow to the head after a primary impact resulted in rapid neurological decline (Tator et al., 2019). When Rowan was sent to the hospital after the fatal hit to the head which occurred on May 8, 2013,

and died four days later, doctors were initially at a loss for what could have caused the immediate neurological decline (Tator et al., 2019). An investigation was carried out which revealed she had suffered two blows to the head just two and five days before her passing.

Rowan's story is sadly one of many where failure to report a head injury led to serious long-term consequences, and in her case, death. Second Impact Syndrome, although rare, demonstrates the absolute necessity for athletes to report their head injuries and symptoms as soon as they happen. Varsity athletes must be in a team/school environment where they feel comfortable facing their injury, which may be facilitated by a good support system.

A recent study of collegiate level athletes by Anderson et al. indicates males in high-risk sports are far less likely to report their concussion symptoms than their female counterparts (Anderson, Petit, Wallace, Covassin, & Beidler, 2021). The same study also found that student athletes who had previously sustained a concussion failed to report their concussion more than those who had never experienced one. The researchers went on to identify more reasons for underreporting concussions and noted that sex, sport-type risk, diagnosed concussion history, concussion knowledge, and pressure from coaches, fans, teammates, friends or family were all reasons for underreporting (Anderson et al., 2021). There needs to be a shift to an environment where athletes do not have these barriers to reporting, as letting someone know about injuries and symptoms immediately, could prevent prolonged long-term consequences and quality of life.

Concussions can arise not only from impacts to the head, but to bodily impacts as well, that may cause excessive movement of the head (Aubry et al., 2002). It is important for athletes to report these incidents to someone, whether it be a teammate, coach, or physical medical attendant. Concussion symptoms can take up to 24-48 hours to manifest, so athletes must closely monitor their symptoms for that time period and try to refrain from taking pain medications that could mask any signs or symptoms (McCrory et al., 2017). It is extremely important for student athletes and those close to them to be well-informed about the effects of concussion so they understand how to recognize a potential concussion event and the consequences of failing to report. Understanding this may be a driving force for student athletes to take hits to the head more seriously.

Return to Academics

As concussions are increasingly studied and talked about in the medical community, there lacks sufficient research on return to academic life, as much of the work is focused on return to play.

In university students especially, just attempting to balance a strenuous course load along with playing varsity sport can be overwhelming. Athletes feel pressured to perform their best in order to impress those around them, including teammates, friends, and coaches. Many varsity athletes have received sport-related scholarships and underreporting an injury to the head may result from fear of losing this financial aid. Academic performance and self-efficacy have been shown to be negatively impacted by concussion in college students (Zimmerman & Kitsantas, 2007). For these students, the side effects incurred from concussion reach further than just physical symptoms , but may affect their standing as a student, since several programs and

bursaries rely on maintaining a minimum grade point average.

The most important aspect of properly returning to academics is the potential for cognitive decline as a result of a mild traumatic brain injury. Studies have demonstrated that a proportion of individuals who undergo a concussion will suffer from prolonged effects, including impaired cognitive function (McInnes, Friesen, Mackenzie, Westwood, & Boe, 2017). The more concussions go unreported, the more likely future concussions are to occur, increasing the potential even further for long-term effects (Guskiewicz et al., 2003). Therefore, creating an environment where students feel comfortable in reporting a concussion must be ensured by all those involved; and how they are guided through the recovery process to ensure a graduated return back to academics, is priority.

There are currently no uniform policies or procedures for guiding a student back into a learning environment (Wan & Nasr, 2021). Student athletes want to feel comfortable when dealing with a concussion in their academic lives without having to worry about repercussions. The athletes' main focus during these times should be their return to normal physical and mental health. Therefore, they should be in a supportive environment where going through this kind of challenge is taken seriously.

Mental Health Effects

In recent years, there has been emerging research on the mental health effects that may arise as a result of a concussion. A 2015 study revealed that college athletes' post-concussion symptoms included an increased level of anxiety and depression (Vargas, Rabinowitz, Meyer, & Arnett, 2015). For university students, mental health is already an area of concern as a vulnerable population due to academic stresses in addition to the challenges of dealing with post-persistent symptoms that can exacerbate one's mental health. A social support system is imperative for the athlete's well-being and full recovery. It is critical for teams to create an environment where teammates feel comfortable encouraging each other to report symptoms, and ensure the athlete is not dealing with it themselves. Any indication of mental health-related symptoms should be dealt with immediately and consistently monitored.

With current best practices available today, different organizations and institutions have been trying to ensure concussion policies are put into place. It is not only important to try and prevent the injury, but also educate individuals on the importance of recognizing, responding, and managing a concussion. Through educational programs such as the Concussion Awareness Training Tool (CATT) for high-performance athletes developed by a team at BC Children's Hospital, the provision of free eLearning modules and resources will allow for a better understanding among university-level athletes on the importance of concussions and how to manage their symptoms. This includes mental health challenges that may rise, as well as allowing for academic modifications. It is imperative to educate student athletes to avoid any long-term future implications and ensure they are taking care of themselves as they are the best advocates for their health.

Future Concussion Research

As more research about concussion is brought forth, improved education and awareness of concussions for university

athletes must be considered. It is critical that university level sports teams take this issue seriously and have policies in place for the care of the athlete in order to avoid long term consequences. Universities must develop these policies to ensure an athlete suffering from this injury is taken care of and a return to academics approach must be developed and incorporated. The lack of knowledge on the most effective ways to recognize, report, and manage concussions must be addressed. On a positive note, as of this year, many varsity level sports teams are requiring athletes to undergo some type of concussion training, such as completing the aforementioned CATT, which is a step in the right direction. By having further knowledge and a supportive environment, varsity athletes will feel more comfortable to report their symptoms. Knowledge and understanding on what is happening to the brain when a concussion occurs has come a long way over the past decade. This needs to be translated to university athletes in order to ensure their safety and health. This knowledge and understanding will help mediate prolonged symptoms and any mental health effects that are known to be prevalent among university athletes when they suffer this traumatic brain injury.

Conclusions

Concussion knowledge and education in immediate recognition and response is imperative to recovery and avoidance of long-term consequences for varsity-level athletes. Having mandatory education for athletes and ensuring clear guidelines and policies are in place, including having a supportive environment, will allow for improved clinical and psychosocial outcomes.

Authors' Qualifications

The authors' qualifications are as follows: Mikaela Wilson, BMSc (c); Dr. Shelina Babul, BSc PhD.

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