

# STUDENT-ATHLETES ARE CALLING OUT FOR HELP IN THE TREATMENT OF CONCUSSIONS



Candace Larsen is a typical teenage girl who just wants to enjoy the benefits of playing sports for her high school while she is developing her academic skills in preparation for post-secondary school. A concussion during a soccer game may have altered the course of her life.

While Candace is from Sudbury and she was playing soccer at the time of her injury, she represents all student-athletes, male and female, who participate in any kind of sport or activity in the secondary schools across Ontario and indeed across North America. Whether it is a recognized high risk sport such as hockey, football, basketball, rugby, or soccer, or other activities where one might not think the risk is as great, such as competitive cheerleading, gymnastics, or wrestling, there is always going to be a risk of suffering an injury that may cause some degree of brain trauma which will produce signs, symptoms and behaviours consistent with concussion. When that happens, it is critical that the key people in the life of the student-athlete be aware of how to identify those signs, symptoms and behaviours, and then understand what accommodations are necessary in all aspects of the student's life in order to allow the brain to heal and recover from the injury.

During an interview that I had with Candace and her mother, Dawn Larsen, Candace had one simple request, *"I wish more people knew about concussions and knew how to treat it and how to treat persons who have a concussion. It's difficult feeling helpless and not being able to explain to someone what happened to you or how it happened because you don't know, you blacked out. You can't explain how you got hit. No one understands that this is the amount of pain I'm in and even if you have headaches once in a while you are not going to be able to compare it to mine. You don't understand the pain. No one sits back and does research on it. They all just assume that it's a "bonk" and you're done in two weeks that you're fine. But really it's more complex than that. No one takes the time to research it and understand it."*

It's time for all people in leadership positions to take significant steps to protect the well being of all students like Candace. It's time for us to do more than just direct coaches, students and parents to web sites for information about concussions. It's time for individual school boards and sport organizations to develop local concussion management programs that include specific protocols and procedures, arrangements with sports medicine specialists who will see injured athletes the day after an injury, training for teachers so that accommodations can be made in the classroom to facilitate return to learn rehabilitation, counselling for injured student-athletes and their parents so that they understand what is happening to them, and a whole new approach to coaching which emphasizes safe play in order to minimize the risk of concussions.

## **THE EPIDEMIC OF UNREPORTED CONCUSSIONS**

A study that was published in the Journal of the American Medical Association in June 2013 reported that in a survey of 9,000 students conducted during 2011 from Grades 7 to 12 in publicly funded schools across Ontario, one in five adolescents said they have suffered a traumatic brain injury that left them unconscious for five minutes or required them to be hospitalized overnight. A statistic researcher in Toronto says this is much higher than previously thought. And further to that, sports such as ice hockey and soccer accounted for more than half the injuries, said Dr. Gabriela Ilie, lead author of the study and a post-doctoral fellow at St. Michael's Hospital.

The Ontario School Boards Insurance Exchange, which provides insurance to most of the school boards in Ontario requires that incident reports be prepared for each injury that occurs among students in those schools. During 2011, a total of 634 incident reports were labelled as concussions or “possible concussions”. Of this, only 60%, or approximately 400 were sport-related. With approximately 1 million students enrolled in Grades 7 through 12 alone, the age group where the incidence of concussions is the highest, the fact that only 400 sport-related injuries were labelled as concussions or possible concussions is great cause for concern given the statistics that have been reported in studies around the world.

Experts from the medical field tend to agree that the annual rate of concussions for sports like hockey, football and soccer typically range from 15 to 20%. With over 900 secondary schools in Ontario, many of which offer competitive hockey, football and soccer programs for both boys and girls, to see only 400 sport-related incident reports labelled concussions or possible concussions is a clear indication that this type of injury is being grossly under reported or unidentified. In fact, St. Michael's College in Toronto reported that out of the 1000 students attending their school in 2011, a total of 80 students were reported as receiving a concussion during the year, amounting to 8% of the total student body. Projected across the province, this means that we might expect as many as 80,000 concussions among the 1,000,000 adolescents attending Grades 7 through 12 per year. But only 400 sport-related incident reports were submitted from across the province in 2011. Considering that there are over 900 high schools alone in Ontario that means that there would have been only 1 concussion for every two high schools during the entire year of competition in 2011. We know that this could not possibly reflect reality and something must be done to improve the identification of concussions in our schools.

## **IMPACT ON LEARNING IS SIGNIFICANT**

Researchers from the Medical College of Wisconsin may have come up with an important discovery which will help us understand the overall impact of a concussion on all aspects of a student's life, including the effect the injury has on the ability of the student to meet his/her responsibilities in the classroom. The findings of the study were published in the September 2013 issue of the Journal of International Neuropsychological Society.

The researchers were studying the natural recovery from sports concussion, and they used 12 concussed high school football athletes and 12 uninjured team mates. They evaluated each injured player at 13 hours and again at seven weeks following their concussion injury.

The injured athletes demonstrated usual post concussive symptoms, but when the researchers performed an fMRI (functional magnetic resonance imaging) on the athletes after 13 hours, they showed decreased activity in the right hemisphere of the brain, which is the part of the brain that controls the ability to be attentive. They concluded that this level of activity in that part of the brain would explain the poor cognitive performance which is typical of an athlete following a concussion.

Seven weeks after the injury, the concussed athletes reported that the signs, symptoms and behaviours consistent with their concussion had resolved. However, the fMRI testing showed that these athletes also had a higher level of activation in their brain than the uninjured athletes. This led the researchers to conclude that their findings may have shown how the brain compensates in a way that facilitates recovery immediately after an injury by “slowing down” activity in order to reduce the stress on the injured part of the brain, and then “increases” the energy level as the brain recovers and is on the way back to normal functioning.

This study has serious implications for doctors, coaches, teachers and parents who are responsible for the well-being of student-athletes who have been identified with a concussion. It could very well mean that long after the signs, symptoms and behaviours consistent with concussion have appeared to have resolved, the brain is still providing “extra” support in the form of increased stimulation and activation in order to help the injured part of the brain function normally. In actual fact, the injury may not have completely healed, but the extra energy level being supplied to the injured area may be making it seem as if everything is back to normal.

The questions that remain to be answered from this study will have a tremendous impact on the rehabilitation procedures that are recommended in the future for student-athletes who suffer from concussions. Does this increased level of activity reflect the effort on the part of the brain or person to perform tasks that pre-injury took less of an effort? If a student was a straight ‘A’ student prior to an injury, and after seven weeks seems to be back to normal, but this return to normal functioning is in fact because of a more intense effort on the part of the person/brain to accomplish tasks that usually took less of an effort, then has the student-athlete really fully recovered from the injury? Is the student even aware that it is taking his/her brain more of an effort to perform cognitively? How long does this increased activity level in the brain last? Does it ever return to normal levels or will this now become the new level of activity needed to perform certain tasks for the rest of the person’s life?

It makes sense that there are limits to the amount of energy and reserve that a person’s brain can draw upon. If as the result of a concussion a student-athlete is forced to use up more of that injury to compensate for the loss of cognitive ability in one particular part of the brain there is quite likely to be some cumulative consequence to that adjustment and some other part of the brain may suffer. Whether those other parts of the brain become more susceptible to injury remains to be proven scientifically, but from a common sense point of view, it does seem likely.

We are learning more and more about the brain every year – indeed every month. In the meantime, we are not able to determine which student-athletes will be able to live through their concussion and continue to thrive in all areas of their

life with seemingly no impact from their injury. For some, the injury may have indeed created a process in the brain that will have altered the course of their life and which may be part of an accumulation of damage that will produce symptoms at a much older age that are consistent with premature aging of the brain, depression, anxiety or dementia. Therefore, we must treat every traumatic brain injury as if it will have serious long-lasting affects on the student-athlete, and that means exercising caution with respect to any form of activity that will produce stress on the functioning of the brain during the recovery period, which according to the study from the Medical College of Wisconsin may be at least seven weeks following an injury. This does not mean that the student-athlete should be prevented from participating in athletics or from attending school, but it does mean that we should be paying particular attention to accommodations that will reduce the risk of causing further damage.

All of the above will put into perspective the story you are about to hear about Candace Larsen, the young adolescent girl from Sudbury who has a story to tell about her traumatic brain injury and the subsequent challenges she has endured.

### **CANDACE'S CONCUSSION STORY**

Candace Larsen is a 15 year old girl from Sudbury who should be excited about entering Grade 10 in September. But on May 9, 2013, during the fifth and final game of a weekend high school soccer tournament in Southern Ontario, Candace and an opposing player bumped together while running for a loose ball and when her head hit the ground her life instantly became anything but normal. This is her story.

Candace has always been a straight 'A' student and her first year of high school in Grade 9 was turning out to be no different. Her marks were in the 90's and even though she was only in Grade 9, she was thrilled during the second semester to have made the high school Varsity Girls Soccer team. Candace had never played soccer competitively before, but she had participated in the sport at a recreational level since the age of seven and she loved the game. She suddenly found herself playing in a competitive league which included girls up to four years older than her, but she did not find the size and age difference much of an issue while playing local teams from the Sudbury Area. Her school team was also pretty successful and even qualified for the Northern Ontario Championships.

During the weekend of May 7 – 9, 2013, she travelled with her team to play in one final out of town tournament in order to prepare for the Northern Ontario Championships. This was intended to be a warm-up for the NOSSA tournament and also give the girls a chance to see what their competition would be like if they won the NOSSA and qualified for the All Ontario Championships. Candace found the size difference between the girls much more pronounced with the Southern Ontario teams. The girls were larger and more aggressive, but her team was still competitive.

Candace was playing her usual position on defence late in the first half of the final game of the tournament. All she can remember is that she and a much larger girl from the opposing team were running for the ball. Her teachers told her that all they saw was Candace hitting her head on the ground. They didn't see Candace actually make contact with the girl.

The teachers/coaches called it a “bonk” on the head. Candace continued to play for another five minutes after the incident. Even though she felt a headache coming on and had a pain in her neck, she felt that she had to continue to play because she was only in Grade 9 and didn’t want to pull herself off. Besides that, half time was only a few minutes away.

During the half time break she knew she couldn’t go on any more. The pain in her head was excruciating. She was laying on the ground on garbage bags, “holding my head, crying. I told my coaches that everything was spinning. I couldn’t see good and parts of the sky were blurry.”

Candace remained on the sidelines and then spent the next four hours travelling home on the team bus. She was very groggy and confused and remembers that she was not well at all. Her team mates kept waking her up from time to time to check on her and then they let her sleep the rest of the way. When Dawn Larson, Candace’s mother met the bus at midnight to pick up her daughter, the teacher told her that Candace had received a little “bonk on the head but she seems to be ok.”

According to Dawn, “Right away when I saw her I knew she wasn’t ok. She was white. Her eyes had different colouring. Even though it was night when she got in the car you could see her eyes were different. She had a really upset stomach and she just wasn’t herself. So I assumed she had a concussion.”

Two days later Dawn brought Candace to see a doctor after the pain kept getting worse. She explained why she waited to seek medical attention, “Because the teachers said it was a “bonk” and she had headaches, I thought it would go away. I had a two concussions myself when I was younger. One I spent time in the hospital and the other one didn’t affect me much.” Dawn also recalled that when she did spend time in the hospital with her own concussion the doctors didn’t do much to help her.

Dawn explained that because she did not have a family doctor at the time, everything seemed to go downhill from the first visit to the emergency room at the hospital. Every time Candace got sick they had to return to the hospital and they ended up seeing a different doctor. But none of the doctors would put in writing that Candace had a concussion. Dawn said, “They said that it was a privacy issue and that they did not like to say that anyone had a concussion in a note that was going to the school. But the school needed a note from a doctor to say why she was not going to school, so it was frustrating.”

Indeed, because it is so difficult to diagnose a concussion, many doctors are now refusing to make a definite diagnosis, instead, referring the patient to a sports medical specialist. This is becoming a huge problem that is being exacerbated by the shortage of doctors through out the region. The first response in most concussion management protocols is to see a doctor. But if you go to the emergency room, and there is no apparent structural damage to the skull and no sign of internal bleeding, you will be told to see your own family doctor or a sports medicine specialist. Apparently what is

happening in many places around the province is that a student-athlete is being brought to the emergency room where he/she “is not” diagnosed with a concussion. That is often enough of a confirmation for a parent to send their child back to school or back to the coach with a clearance to play again. This may be one of the reasons we have so few reported incidents of concussion in Ontario. It is a case of wilful blindness that is putting our children at great risk, both in the game and in the classroom.

Therefore, it wasn't until Candace had an MRI about two to three weeks after the injury that she was actually diagnosed with a concussion. The MRI showed some swelling of the brain but there was no bleeding.

When asked what it was like during the first few days after the injury, Candace explained, “It was painful. I don't know. I wasn't myself. It was a weird feeling of pain. I wore sunglasses and had ear plugs every day after because I couldn't handle the light and the sound or the smells. It was difficult after. Even loud noises would hurt.”

Candace had not at that time received any significant advice from doctors or medical professionals on what she should be doing, so she decided on her own to wear sunglasses and ear plugs, and avoid light and noise just to try to control the pain. She didn't know that what she was doing was correct. It just allowed her to avoid some of the pain.

What was disconcerting to Dawn was that “Some of the doctors we saw in the emergency room visits seemed to make fun of her for wearing sunglasses and ear plugs. The medical staff in general were not very receptive to the fact that she needed to wear sunglasses, and one neurologist we went to see was surprised that Candace was having problems with the lights. There was only one emergency room doctor who was actually sensitive to the need to turn down the lights because he could see that she was trying to look at him but she couldn't keep her eyes open.”

“The whole thing about the fact that she couldn't stand lights, and sound and smells was a real problem when she went back to school because no one seemed to understand why these things were bothering her. They couldn't understand why she would need to wear sunglasses and some of the students made fun of her,” Dawn recalled about the first couple of times that Candace tried to return to school.

“She tried to go back to school within days of the injury because she is such a conscientious student and she was worried about her marks. She even tried to go without the sunglasses, but the pain was so great that she just couldn't do it. From the outside she looked like somebody who was very healthy, but on the inside she was feeling awful.”

Candace also felt a lot of pressure to return to playing soccer since the team was preparing for the NOSSA championships. Some of this pressure might have been self-imposed because of her desire to play, but she also felt some real or perceived pressure from other members of the team who encouraged her to come back out and to just travel with the team to the

tournament to show support. “They wanted me to go to the game to support the team, but I couldn’t take the ride to the hospital let alone a three hour car ride to the tournament.”

Dawn explained to the school staff that her daughter was feeling pressure to return to school, but until they found a family doctor, she wouldn’t be able to bring a note explaining that she had a concussion. The emergency room doctors refused to write such a note. She was told that the school hadn’t experienced this kind of situation in a long time. Even Candace got the impression that hers was the first concussion injury of this nature that the school had experienced in years.

Yet, statistics in both Canada and the United States show that anywhere from 10 to 15% of student-athletes attending secondary school will experience a concussion in any given year, so it did not make sense to Dawn that her daughter’s injury was so unusual. Dawn felt that through no fault of their own, the teachers were not properly prepared to deal with the aftermath of a concussion with their students. She wasn’t placing blame on the teachers, but Dawn felt that no one seemed to know what was going on or how to help Candace recover from her injury.

At the time that this article is being written, it has been 90 days after the injury occurred. Candace still has severe headaches, difficulty concentrating and low energy levels. Additionally, Dawn indicated that her “personality totally changed and is just now starting to come back. She was always a happy person, but after the concussion she has become very negative, edgy and depressed all the time. She is starting to get better but she is still a totally changed person from the girl she was before.”

Candace even lost touch with most of her friends because she couldn’t sit up to communicate with them by phone or by sending text messages. It was almost two months before she could turn on a computer and she now has contact with only a few of her closest friends. She has basically removed herself from society while dealing with her recovery process.

Between May 9 and June 14, the end of the school year, Candace was able to spend only two full days at school and about two half days per week on top of that. Her marks were high enough that she did not have to complete any of the year end exams and she was only required to do a couple of small projects to finish off the term work for some of her classes. Nevertheless, Candace felt a lot of anxiety over her inability to participate in school since she has always been a high achiever. This anxiety and stress further exacerbated the situation and obviously produced a higher than desired activity level in her brain, thus possibly delaying recovery. On top of that many of the students teased her about faking her injury and just trying to get out of school and exams. She looked fine to everyone else. They couldn’t see anything wrong.

Another problem that Candace has encountered as a result of not having a family doctor, is that she has seen no less than eight different doctors since she was injured, and according to Dawn, “No one could tell us anything about what to expect or how to deal with the concussion. The neuro psychiatrist was the only one who could explain the mechanics of what was

happening in the brain to cause these problems, but we didn't get much help from anyone on what to expect or how to deal with the symptoms. A couple of doctors told Candace to stay off the computer and phone, but not much else.”

Candace is admittedly “terrified” about going back to school. She is still only able to read two pages before she has to stop. She loses the ability to focus and concentrate after two pages and she is finding this to be extremely frustrating and stressful, which is not helping the situation. She is also worried about what the teachers and other students are going to say if she has not recovered to the point where she can attend school full time and do the regular assignments and tests. Dawn confirmed that she is afraid that everyone at school will expect that the summer months will have been long enough for Candace to recover and they will find it hard to believe that she is still experiencing so many problems that she will not be able to do much in September. It is also going to be hard for her friends and class mates to understand that even though she looks healthy, she has not recovered and she is still in pain.

Candace has started doing lower body workouts with soccer specific skills, but she is still only able to walk about two blocks before she gets tired and must stop to rest. After 90 days, Candace finds it exasperating that she is no where near the physical fitness level she was at before her injury and until she gets her strength back, she is unable to get back into shape. Her energy and the headaches are preventing her from doing anything that requires even a minimal amount of physical effort.

Dawn wonders how things might have been if Candace was not in excellent physical shape at the time of the injury and if she was not such a high academic achiever. “If Candace is having so many problems recovering, what about young people who are not in shape and who have cognitive difficulties to begin with. The slow recovery is causing a lot of frustration but it could have been much worse.”

Dawn admits she, as a mother, is “tentative about school starting. Candace wants to do well in her classes and get the marks back up high again and she also wants to play soccer in the second semester, so she is going to be putting a lot of pressure on herself during the next school year. I don't know how that is going to affect her recovery.”

## **RECOMMENDATIONS**

School Boards are obligated to “promote student achievement and well-being”. This means that every school board must pay particular attention to helping students cope with concussions, especially those that are experienced by student-athletes participating in extracurricular, intramural or physical education activities and competitions. The statistics show that as many as 80,000 student-athletes in Grades 7 through 12 are receiving concussions each year, but only 400 incident reports are being submitted to the Ontario School Boards Insurance Exchange. This is not acceptable and something must be done to improve the ability to identify and track possible concussions.

At the very least, school boards should address the following recommendations:

1. Every school board should develop its own comprehensive concussion management program that clearly outlines the roles and responsibilities of school administrators; coaches; teachers; parents; and student-athletes.
2. Each concussion management program should include a mandatory protocol that must be followed for every student-athlete who is identified as being involved in an incident which may have caused a concussion or who actually displays signs, symptoms or behaviours consistent with concussion.
3. A formal report must be filled out at the office for each student-athlete who may have been involved in an incident that may have caused a concussion. This includes incidents that may have occurred in community recreational activities or from accidents that happened in non-sporting events. It must be recognized that no matter where or how a student received a concussion, the injury is going to have a direct affect on his/her functioning in the classroom and at home.
4. Each concussion management program should include a provision that a suspected concussion is to be considered to be an “identified” concussion until a doctor, the parents, the teachers and the coaches all declare that they no longer are aware of any signs, symptoms or behaviours that may indicate recovery is not complete. Further, the student-athlete must also self-report the absence of any post-concussion effects.
5. Every school board should make arrangements with one or more sports medicine specialists who are familiar with sport-related concussions, to make time to examine on the day following an injury any student-athlete who is suspected of having a concussion. The sports medicine specialist must be in a position to order an immediate MRI for the student-athlete if deemed necessary.
6. All student-athletes who are suspected of receiving a concussion should be required to attend, with their parents, a session with a concussion management consultant from the Board Office, who will provide the student-athlete and his/her parents with an explanation of the recommended accommodations to be followed during the recovery period and help them develop a rehabilitation plan that will facilitate a full recovery. This plan should be provided to all of the student-athlete’s classroom teachers and to the athletic coach responsible for the student-athlete.
7. A concussion management unit should be mandatory as part of the physical and health curriculum at all grade levels from Grade 7 and above and should be one of the first units taught during the school year or semester.
8. All student-athletes must be required to attend a concussion management workshop presentation before participating in any inter-school or intramural sports activity.

A full concussion management program would certainly be much more comprehensive, but the above recommendations would go a long way to protecting the students in our schools across Ontario, and indeed across North America.

**About the author, Robert Kirwan**



Robert Kirwan is a member of the Ontario College of Teachers who has a Masters Degree in Education Administration. He retired in 2001 from a 28 year teaching career and was elected in 2010 as a School Board Trustee with the Rainbow District School Board in Sudbury, Ontario. Robert Kirwan provides independent consultation services with respect to the academic implications of sport-related concussions among student-athletes, including accommodation guidelines for classroom teachers, home care guidelines for parents/guardians, and lifestyle adjustments student-athletes must consider in dealing with the effects of a concussion. He is currently taking on the role of President & CEO of CMP Concussion Management Partners Inc., a company in which he is also a Principal Partner.

[www.concussionmanagementpartners.com](http://www.concussionmanagementpartners.com)

<p>FOR A SHORT VIDEO INTRODUCTION <a href="http://www.youtube.com/watch?v=PiKSzCIFy-0">http://www.youtube.com/watch?v=PiKSzCIFy-0</a></p>	<p>FOR THE FULL VIDEO INTERVIEW <a href="http://www.youtube.com/watch?v=cAh33tBSxAg">http://www.youtube.com/watch?v=cAh33tBSxAg</a></p>
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