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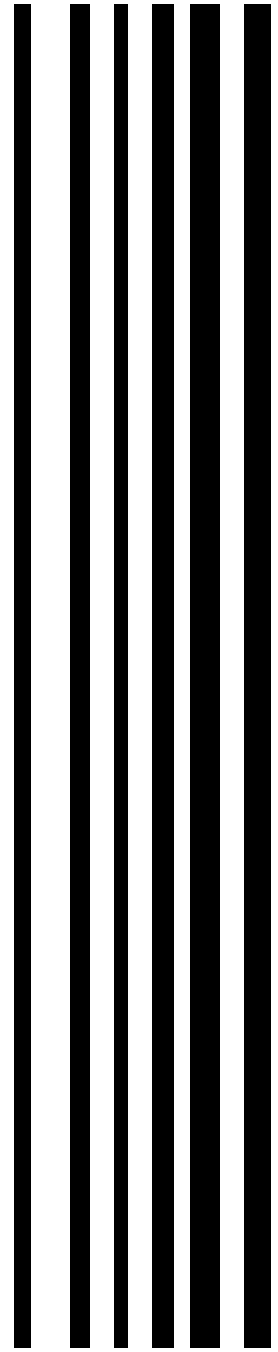


STUDYING CONCUSSIONS WITH A CONCUSSION

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photo RENATA BASTOS GOTTGROY

Many researchers feel an emotional connection to their work, but for Renata Bastos Gottgroy this takes on a whole new meaning. As a PhD student at Auckland University of Technology in New Zealand, Renata both studies concussions and is afflicted by one.

On February 6, 2016, I watched Renata get checked into the boards during an ice hockey game as a member of the York University Lions Women's Hockey Team. As I sat in the stands, suffering from my own concussion, I couldn't help but feel the hit in my bones. Before I knew what was happening, I was running down to the ice. I knew that something was wrong.



She laid on the ice for a few minutes, eventually stumbled her way into the hallway and sat there. Tears in her eyes, she looked up at me and we had one of those telepathic moments all best friends share; she was not okay and we both knew it.

Renata had a concussion, a mild traumatic brain injury (mTBI) which had resulted from repetitive hits to the head over the last week. Her prescription was to rest until her symptoms went away.

For months I struggled with her through the dark rooms, the delayed exams, wearing sunglasses indoors, and avoiding loud places. As days turned into months, and months into years, we progressed slowly. For Renata, the headaches never really went away. Although, she became less sensitive to light and sound, she struggled deeply with visual and vestibular defects. Any sort of head movement – from turning her head or driving a car – would make

her nauseous and leave her with horrible headaches. Even reading was nearly impossible. She went through intensive visual therapy to re-train her eyes, but to this day many of her worst concussion symptoms continue to linger.

Despite these struggles, Renata fought through life one step at a time. She was determined to finish her bachelor's degree in kinesiology and pursue her passion in biomechanics. "I was so fortunate to have maintained my ability to think like myself," Renata said. "Cognitively I was still able to function and that was a key part of my return to classes." However, it wasn't always smooth sailing. I distinctly remember a frantic phone call from Renata after her first exam post-concussion. She had passed out in the stairwell and couldn't move because of the pain. There were plenty of scary moments like this where we both never thought she would recover. The only way forward was to reach out to counselling and disability services at the university to receive accommodations for her exams. This included writing her exams in a quiet room and being allotted extra time. All she knew was that giving up was never an option.

In addition to academic challenges, Renata faced many personal battles and struggled to re-define herself after her concussion. Born and raised in Brazil, Renata was a natural athlete and she held that very close to her identity. Upon moving to New Zealand at the age of six, she competed in a vast variety of sports from a young age. Renata followed in her brother's

Before I knew what was happening, I was on my feet and running down to the ice.

footsteps and added inline hockey to her many pastimes, eventually becoming a member of the New Zealand Women's Inline Hockey Team at only 13 years old. But her heart always came back to soccer. Competing at the national level with several international offers, she planned on pursuing a soccer career until an ankle injury took her off the pitch for a season. At this point, it was suggested that she take a shot at ice hockey. At 17 years old, Renata laced up her ice hockey skates for the first time. Within a year she was playing semi-professionally in Linköping, Sweden and

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was quickly recruited to York University after a coach watched her play on the New Zealand National Women's Ice Hockey Team at the International Ice Hockey Federation World Championships.

With less than two years of ice hockey experience under her belt, Renata moved across the world to Toronto, Canada to play on the York University Lions Women's Ice Hockey Team. Renata was a rising star for the Lions both on and off the ice. During her three years with the team, Renata was a leader and influential player while continually being named an Academic All-Canadian and a member of the Dean's Honour Roll.

But after her concussion, Renata was no longer able to exercise. For the first time in her life, she was forced to leave the world of sports behind. Redefining your identity is not easy. As athletes, Renata and I had dedicated our lives to becoming the best at what we did. All of that was gone for Renata before she was ready to give it up. She began to fully dedicate herself to her studies, remembering that it was her love for biomechanics that drew her to the kinesiology program at York University in the first place. Her interests in biomechanics and mathematics blossomed as she began to further develop skills in this field through completion of her honours thesis focused on spine biomechanics. Once again, I watched as the life began to come back in her eyes as she told me about the work she was doing. Academics was a positive outlet, and an opportunity for her to give back in a constructive way.

Upon graduation, Renata decided to

head back to live with her family in Auckland, New Zealand. It was here that she began to re-evaluate her current situation. She knew that there were skills she still wanted to learn, and she felt drawn to academia. However, while she was able to push through her undergraduate degree, committing to a PhD seemed discretionary and something she didn't have to subject herself to. Committing to future academic endeavours was not something to take lightly after everything she had been through. Taking some time off from academics, Renata returned to her athletics roots as a fitness trainer and enjoyed much needed time with her friends and family to help her heal, both emotionally and physically. While working within her limits, she



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was able to do moderate activity again which allowed her to reconnect with some of her favourite pastimes such as surfing, skateboarding, and snowboarding. Getting back to her roots gave Renata the energy she needed to take a second look at her future.

“Coming out of my degree, I knew that I wanted to develop a skill set in data science and mathematics,” Renata recalled. “Instead of doing an additional undergraduate degree in computer science, I thought I would be crazy and do a PhD in it.” She reached out to her idol, Patria Hume, a professor in human performance in the School of Sport and Recreation at the Auckland University of Technology.

“I went into the meeting, not really having much of a plan at all, I just told her what skills I wanted

to learn and what my background was,” Renata said. It was Hume who brought up the idea of applying this to concussion research, suggesting a few different avenues they could pursue together. Renata felt it in her bones; this is what she was going to do! She knew it wasn’t going to be easy, but she found the motivation to dedicate herself to research once again.

Every day is a battle. Plagued with headaches, Renata continues to fight for her education and

for the field of concussion research. Reflecting on her own experiences and how she could help herself, she realized a lack of concussion management on a global scale. She became coaxed by the idea of implementing change for concussion patients.

Combining mild traumatic brain injury (mTBI) with data science, Renata is extracting knowledge from national and clinical mTBI data that can aid in the prediction of patient recovery and optimize management pathways. Catering to the complexity of mTBI’s, Renata’s research allows for more personal management of individual patients, eliminating the typical “one-size fits all” approach. This knowledge will be implemented into a prototype clinical decision support tools that she hopes to eventually be

used by front-line health care providers in order to support high-quality and consistent management of concussions.

“At times I feel like it’s a great thing that I study concussions, because the outcome is going to directly help people like me,” Renata said. Becoming an expert in the field, Renata has felt empowered in her own injury, knowing that she is the most qualified person to be handling her condition. She regained control over her situation through her studies after so many years of uncertainty.

But on the flip side, there are still times where this becomes a source of anxiety for Renata because there is still so much that we do not know. She explains that this can be deterring when trying to stay motivated because it affects both her research and her personal life.

“I was struggling to read a sentence that stated how concussions can cause concentration issues and lack of memory retention,” Renata recalled. “I’m sitting there with a massive headache thinking that’s what I am feeling right now. It can give you a bit of a complex.”

Having such an emotional connection to your research is rare, but it provides Renata with the passion she needs to persevere. Although she insists that she is not too involved in her degree, there are certainly times where the lines become blurry. “Bias and passion can be easily mistaken for each other,” Renata said. “I don’t think I have bias, but I definitely have passion. So I am scared that people would see that as

the same thing.” In academic situations, Renata says that she finds it difficult to remain impartial due to her personal experiences, and often catches herself using them as examples.

Renata’s passion certainly bleeds through her personality. Personally, I don’t know where I would be without her. Struggling with my own concussion throughout my undergraduate studies, we leaned on each other to get through every tough day and set back. Renata’s resilience and determination is infectious and she inspires everyone – especially those struggling with invisible illnesses – to fight through adversity. Leveraging her personal experiences, she became an expert in the mTBI landscape in New Zealand. Her work will redefine patient

care and allow others to receive more personalized and advanced treatment after sustaining a concussion.

Renata is not defined by her concussion. She chooses every day to fight against her limitations. It’s not easy, and not every day is pretty, but, from thousands of miles away, she inspires me every day.

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