

Hard work is paying off for Canada's foremost concussion researcher

Matching treatment with the injury through lab tests could lead to a speedier recovery

David Israelson

Dr. Charles Tator says that Canadians understand the seriousness of concussions better than ever before, and now he wants doctors to have better ways to diagnose them.

"There is not a good enough method. Right now, the diagnosis of concussion is a clinical diagnosis," says Dr. Tator, founder of the Krembil Research Institute's Canadian Concussion Centre.

A clinical diagnosis means that doctors can determine whether someone has suffered a concussion only by looking at the symptoms. For example: Is the patient dizzy?

Dr. Tator and his colleagues are currently working on the next step. It would be a breakthrough to diagnose concussions "through a combination of imaging, blood tests, EEGs (electroencephalograms) or any of the 20 to 30 other methods that have been tried," he says.

Pinpointing concussions through laboratory tests would make it easier to prescribe treatment that more closely matches the injury – and that could lead to a speedier recovery.

Annually, as many as 200,000 Canadians suffer from concussions. The causes can range from a fall on the ice or a blow on the head from an accident at home, at work or in a car mishap, to a hard hit to an athlete in sport. "Not all of these people get better," Dr. Tator says. "A large number of people are walking around with residual symptoms."

And although not every bump on the head means a concussion, there are some 60 different symptoms that may indicate an injury. They range from aversion to light, persistent headaches, insomnia and an inability to concentrate. It can also lead to mental health issues such as anxiety, depression or even suicidal thoughts.

One brain condition, called chronic traumatic encephalopathy (CTE), resembles Alzheimer's disease, and it can lead to premature death. Yet its diagnosis is difficult to distinguish from a concussion.

The problem is, right now the only way doctors can be 100 per cent sure whether the condition is CTE or concussion-related is by examining the patient after death.

"Can you imagine that in 2017 you have to do an autopsy to make a correct diagnosis? We don't have an in-life method yet to diagnose CTE, but we're close," Dr. Tator says.

Along with colleagues such as Dr. Carmela Tartaglia, who was recently awarded the Marion and Gerald Soloway Professorship in Brain Injury and Concussion Research, Dr. Tator has been instrumental in building greater awareness and understanding of concussions and their consequences.

His July 2013 paper in the *Canadian Medical Association Journal*, "Concussions and their consequences: current diagnosis, management and prevention," has helped inform and focus public discussion about concussions.

The Canadian Concussion Centre's four-pronged approach includes education and treatment, as well as research and diagnosis. The centre is making a difference among athletes, too, working with players and coaches to make them more aware of the steps for preventing concussions.

"Athletes are smart, and they respond to the necessity for prevention," Dr. Tator says. In rugby, for example, there used to be a lot of broken necks from a play that called for collapsing the scrum, when opposing teams scrape and paw for the ball.

"They have changed the way they play. They don't collapse during scrums anymore," Dr. Tator says.

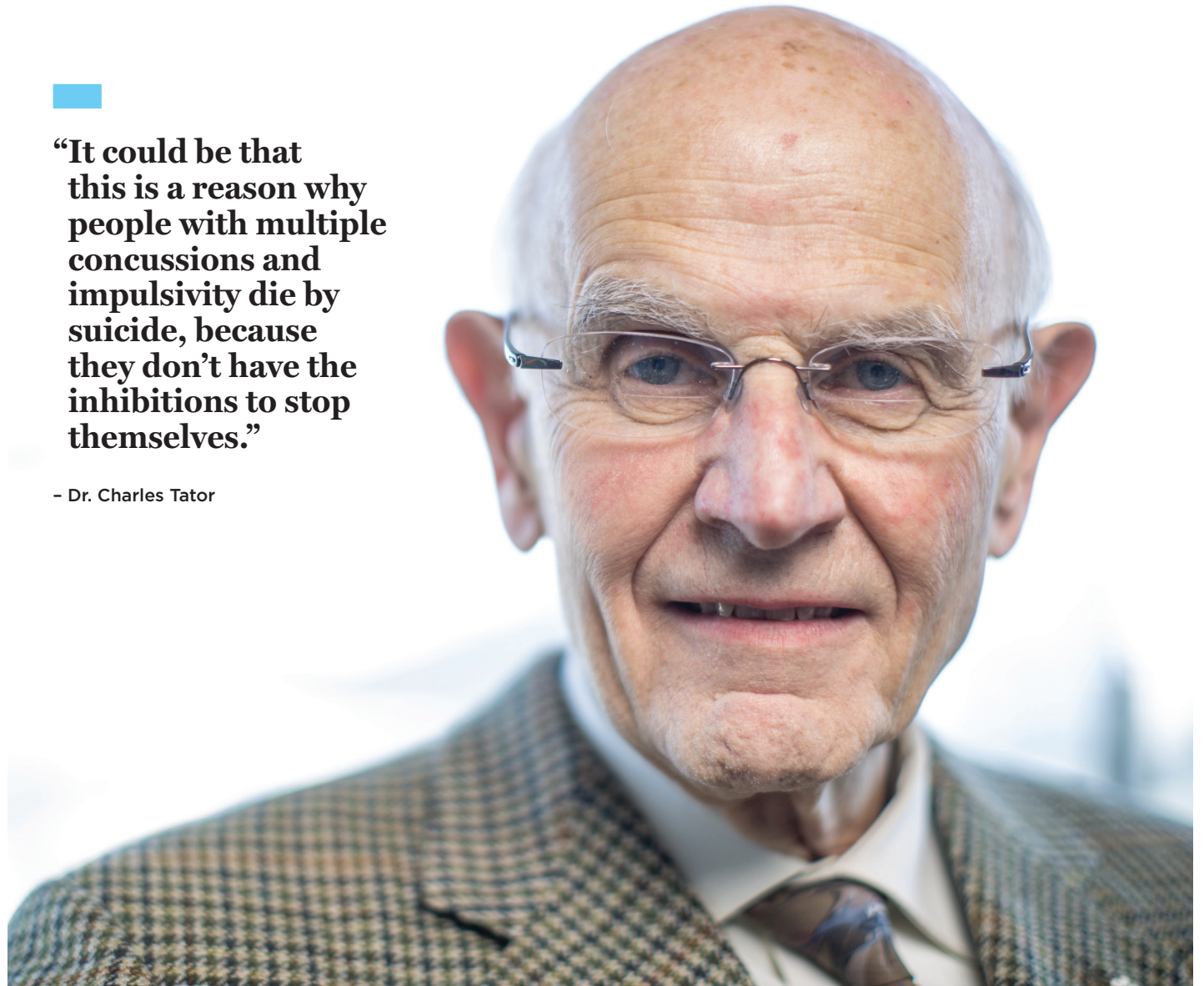
Similarly, he says the days seem to be numbered for the single-purpose "enforcer" in hockey, whose role was simply to fight and instigate the opposing team. Players are now hitting each other from behind less frequently – a blindsiding move that can often cause concussions.

Concussion research at Krembil is wide ranging, with scientists also working toward a number of diagnostic breakthroughs. For example, they have located a particular white matter tract in the brain of concussed patients that when damaged seems to trigger impulsive behaviour, Dr. Tator says.

"It could be that this is a reason why people with multiple concussions and impulsivity die by suicide, because they don't have the inhibitions to stop themselves," he explains.

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Dr. Tator works extensively with schools to help them design programs to reintegrate kids who have had concussions back into the classroom, with accommodations for their injuries.

The project has also developed its own educational support program, which has patients come to the hospital for two-hour sessions twice a month to learn more about concussions and get answers to some of their questions about concussions.

"These sessions will be made available on YouTube, so people who aren't nearby can benefit, too," Dr. Tator says.

While there's still much work to be done, Dr. Tator is pleased with the progress so far. "We have one of the most multidisciplinary concussion research teams in the world, and we are starting to get the answers," he says. ■



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