Former WWE Wrestler Christopher Nowinski Leads Charge in Treating and Preventing Brain Injury in Athletes

For weeks after taking a hit to the head in the ring, professional wrestler Chris Nowinski had an experience so disturbing he remembers it vividly 14 years later. While sleeping one night, he dreamt that he jumped up to catch a falling object. Moments later, he woke up on the floor. He had lost control of the bed and crashed into a nightstand.

This incidence of REM Sleep Behaviour Disorder, a condition in which people act out their dreams, along with pounding headaches and nausea, convinced Nowinski that something was really wrong. He had post-concussion syndrome.

That was the beginning of the end of his WWE career, and the start of a life of advocacy. Perhaps more than any other individual, Nowinski is responsible for sparking the public conversation about concussions and Chronic Traumatic Encephalopathy (CTE), a degenerative disease of the brain found in athletes with a history of repetitive brain trauma.

Those with CTE, including many former football and hockey players as well as boxers, suffer from worsening mental, emotional and physical symptoms, including dramatic mood swings, personality changes, and loss of memory. In some cases, CTE leads to severe depression and even violence.

Nowinski, who played on the Harvard University football team while doing his undergraduate degree there, wrote Head Games: Football’s Concussion Crisis in 2006. The book examines the long-term effects of head trauma among athletes and has since been made into a documentary.

A year later, Nowinski and Dr. Robert Cantu, a neurosurgeon who had treated him, founded what is now known as the Concussion Legacy Foundation, a nonprofit organization dedicated to advancing the study and treatment of brain trauma in athletes and other at-risk groups. The organization now has a Canadian affiliate.

In 2008, the foundation partnered with the Boston University School of Medicine to form the BU CTE Centre. The centre operates the largest brain bank in the world. More than 400 brains have been donated to data, helping the bank create a compelling body of evidence that illustrates the connection between brain trauma and CTE. Nowinski serves as Outreach, Recruitment, Education, and Public Policy Leader for the organization.

In 2011, researchers studied the brain of NHL enforcer Derek Boogaard, who died of an overdose of alcohol and painkillers, and determined he had been suffering from CTE.

Nowinski says the end goal is for researchers to learn how to treat CTE, including preventing it from starting or stopping the progression of CTE. “The other challenge is prevention,” he adds. “We can reduce the rate of CTE by changing the way we play sports — by banning tackling in kids’ football games, for example, and by restricting hitting in practice in professional football leagues. It’s the same logic that applies to smoking,” he explains. “Cutting back on the number of cigarettes you smoke in a day helps reduce the risk of lung cancer.”

Despite the challenges ahead, Nowinski is optimistic. “This is a fight we can win but we need everybody who cares about concussions and CTE to step up and play a role — fans and athletes along with their parents and friends. We’re building a movement,” he says. “But it’s still early.”

Randi Druzin

A New Approach to the Treatment of Cerebral Concussion

Meditech Rehabilitation has developed specific protocols to mitigate the symptom complex associated with traumatic brain injuries, resulting in the restoration of the patient’s quality of life.

Learn more at www.bioflexlaser.com
Dementia: A Global Health Crisis That Needs to Be Tackled

In May of this year, all member countries of the World Health Organization (WHO) are invited to adopt a Global Action Plan for dementia. The plan was promulgated by an international organization in the World Dementia Council, which was created in 2011 by the former Prime Minister of the United Kingdom, the late Baroness Jay of Pinkenburn, in the common cause for dementia. As a Canadian, I am the direct descendant of the latter. The Council is entirely the brainchild of my own family. “One of the benefits,” he says, “is that it allows the algorithm to adapt to the individual’s abilities and gently push them to improve.”

BrainHQ exercises are designed to improve memory, speed, and attention. With more than a hundred peer-reviewed studies substantiating its claims, and TIME magazine listing the active study as a top scientific discovery of 2016, BrainHQ is used to help people develop dementia and reduce the progression of the condition in those who have it.

Dr. Nouha Ben Gaied, Director of Research and Development at the Federation of Quebec Alzheimer Societies, says her organization is working in conjunction with DynamicBrain to incorporate BrainHQ into its program and services.” There are several brain training programs out there,” she says. “But that makes us unique in the scientific data behind BrainHQ.”

Randi Drum

Diseases on the Path to Cures Have the Potential to Improve Lives

Every nine minutes, a Canadian stroke — it is the leading cause of severe disability.

Inez Jabalpurwala

President and CEO, Brain Canada

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IN THIS ISSUE

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Most adults find it more difficult to remember names, faces, and dates as they age. But many struggle to get an answer to the question, are those changes due to normal aging or are they an early sign of something more serious such as Alzheimer’s Disease?

That is why Baycrest Health Sciences, a world leader in the research on memory and aging, created the Cogniciti Brain Health Assessment. This online tool has been designed to meet the needs of concerned boomers and seniors. It is free, private, online, takes just 20 minutes to complete, and has been research-validated to provide adults ages 50–79 with an immediate brain health score and an answer to the question — is my memory normal or should I see my doctor?

More than 50,000 Cogniciti assessments have been completed by adults across Canada and beyond. If you have a desktop or laptop computer with internet access you can too. Simply go to Cogniciti’s website: www.cogniciti.com.

Managing your brain health made easy

In addition to helping adults proactive

ly manage their brain health, Cogniciti’s

assessments is playing an important role in

developing the next generation of de

mentarial therapies. Historically, research-

ers have focused on finding solutions for

people suffering from Alzheimer’s Dis-

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prevention: helping adults at risk of dementia stay healthy longer.

Once Alzheimer’s disease starts interfering with day-to-day living doc-

tors can’t do anything to stop its pro-

gression. But medical science does know how to maximize healthy living in cognitively healthy adults and those with dementia through smart lifestyle choices such as exercise and diet,” says Michael Mooght, President and CEO of Cogniciti (a subsidiary of Baycrest). “In addition, there are now numerous drugs in clinical trials that developers hope will become ‘statins for the brain’ — drug therapies that lower the risk of Alzheimer’s in adults with risk factors. The challenge for scientists is to speed the development of these solutions from the lab to those in need.

A big hurdle in getting new brain health drugs and non-drug therapies to market is recruiting enough volunteers into clinical trials. The traditional pro-
ceess of finding volunteers through doc-
tors’ offices isn’t effective, because adults who see their doctor for a memory issue are often too far into the disease process to qualify for at-risk studies. And print and TV ads have been attracting too many healthy adults. Cogniciti’s assessment addresses this issue by inviting adults who have completed the test to join a free Research Registry for brain health stud-
ies. Cogniciti’s team uses the data from the assessment to match Registry volun-
to clinical research studies that fit their brain health scores and health his-
ory. The result: a much smoother and ef-
ective process for all concerned.

The importance of being proactive

Shirley Whitfield knows all too well how dementia can shatter lives. Both of her parents and all four of her grandparents suffered from the disease.

“I remember as a young child being quite frightened by the behaviors of my grandparents due to the impact of their cognitive disorders,” says the Windsor, ON resident. Dementia also figured prominently in Whitfield’s work life. A retired geriat-
rics nurse, she regularly witnessed how memory problems frustrated patients and diminished their quality of life. This aging-related disease is more top-
est of mind for Whitfield now that she is ap-
peaching 70, and because dementia is often genetic.

“My personal history combined with my work experience have left me hungry for better ways to proactively manage my brain health,” she says. “Proactively managing your brain health is easy. It all takes is 20 minutes and a visit to www.cogniciti.com. 

Gavin Davidson

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Available MS Treatments Have Nearly Tripled Since 2005

Dr. Jiwon Oh is a physician at St. Michael's Hospital and a leader in MS research. “Since 2005, we have nearly tripled the number of available treatment options,” says Dr. Oh. “Another huge benefit of using new technologies such as MRI is that they help us to personalize treatment for individual patients, which is currently a huge unmet need in clinical practice.”

An exciting time in MS research Twenty years ago, tailoring MS treatments to individual patients was unheard of, but the treatment landscape of multiple sclerosis has radically changed. Dr. Oh points to the fact that there were no disease-modifying treatments available until the early 1990s, and it was not until 2005 that a shift truly occurred. Now, the increasing availability of effective disease-modifying therapies has shifted the aim of therapeutic interventions from a reduction in relapses to the absence of any signs of MS.

“Since 2005, we have nearly tripled the number of available treatment options.”

Dr. Jiwon Oh, Staff Neurologist, St. Michael’s Hospital, Scientific, Keenan Research Centre of the Li Ka Shing Knowledge Institute, Assistant Professor, Division of Neurology, University of Toronto

Gavin Davidson

**WHAT IS MS?**

- **MS is an autoimmune disease of the central nervous system (brain, spinal cord).**
- The disease attacks myelin, the protective covering of the nerves, causing inflammation and often damaging the myelin.
- **Myelin is necessary for the transmission of nerve impulses through nerve fibers.**
- If damage to myelin is slight, nerve impulses travel with minor interruptions; however, if damage is substantial and if new tissue replaces the myelin, nerve impulses may be completely disrupted, and the nerve fibers themselves can be damaged.

**POTENTIAL RISK FACTORS**

- **Lifestyle habits**
- **Age**
- **Genetic background**

**COMMON SYMPTOMS**

- **Extreme fatigue**
- **Loss of coordination**
- **Weakness**
- **Tingling**
- **Impaired sensation**

**IMPACTS**

- **Physical**
- **Mental**
- **Social**
- **Financial**

**People aged 20–30 are the MOST DIAGNOSED**

Source: Multiple Sclerosis Society of Canada

**Available MS Treatments Have Nearly Tripled Since 2005**

IMNOVATION

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**Effective therapies exist for RRMS**

The three main types of multiple sclerosis are RRMS (primary-progressive multiple sclerosis), SPMS (secondary-progressive multiple sclerosis), and PPMS, which is by far the most common. The two main presenting types of MS are RRMS and PPMS, which unfortunately do not yet have an approved cure. The number of women and men affected by RRMS is approximately equal, and the onset tends to be in one’s 40s or 50s. In RRMS, for which numerous effective therapies are available, women are affected twice as often as men and most people are diagnosed in their 20s and 30s. Over time, people living with RRMS can transition to SPMS.

**Early diagnosis is key**

MS attacks the protective covering—myelin—of the brain and spinal cord, as well as the axons that lie underneath myelin, causing inflammation and damage. When this happens, the normal flow of nerve impulses is interrupted or disrupted. Because the relapsing phase of the disease is characterized by ongoing inflammation, it is essential to diagnose the disease as early as possible.

**If damage to myelin is slight,** an individual may notice a reduction in physical coordination and be more prone to falling. With minor damage, symptoms such as fatigue, loss of balance, or muscle weakness can occur. More advanced damage to myelin can cause symptoms such as numbness, tingling, and weakness.

**Potential risk factors**

- **Age**
- **Gender**
- **Genetic background**

**Common symptoms**

- **Vision problems**
- **Bladder problems**
- **Cognitive impairment**
- **Mood changes**

**Impacts**

- **Physical**
- **Mental**
- **Social**
- **Financial**

**Most diagnosed**

People aged 20–30 are the most diagnosed.
Facing the diagnosis
MS is currently classified as an autoimmune disease of the central nervous system, which comprises the brain and spinal cord. While it is most often diagnosed in young adults up to late 20s and early 30s, younger children and older adults are also diagnosed with the disease. Decades of research have the cause of MS remains a mystery. There are theories that environmental, genetic, and biological factors all play a role in MS.

MS is unpredictable and can cause symptoms such as extreme fatigue, lack of coordination, weakness, tingling, impaired sensation, vision problems, bladder problems, cognitive impairment, and mood changes. Its effects can be physical, emotional, and financial. "When I was diagnosed, my condition was pretty awful," recalls McGugan, who suffers from relapsing-remitting multiple sclerosis (RRMS). "After suffering through dizziness, memory loss and loss of concentration, I had a serious episode which led me to visit my doctor."

"You can never lose hope," she says. "I'm thankful I'm in this treatment program because it's been a great help to me and I have hope that things will get even better in the future."

Finding the right therapy
RRMS is characterised by clearly defined attacks of neurologic symptoms, much like the one experienced by Rona, and it is treatable. But the recent explosion in available therapies for RRMS has brought new complexity to treatment decisions faced by physicians. More and more, doctors need to anticipate the impact of a particular therapy on a specific patient before deciding on treatment sequencing.

McGugan worked closely with her physician, Dr. Jason Oh of St. Michael's Hospital, to develop a multi-pronged approach to treatment that includes a disease-modifying therapy and daily oral medications to manage symptoms, along with yoga every morning, which was suggested by McGugan's physical therapist. "Dr. Oh recommended this therapy combination right after my first episode, and I've been on the same treatment for the past four and a half years," says McGugan. "It's been a huge help to me on the right therapy, as I have not had any more episodes since I started treatment."

Focusing on the positive
While there is currently no cure, every day researchers are learning more about what causes MS and are narrowing in on ways to prevent it. Studies funded by the MS Society are looking at whether certain risk factors, such as lifestyle habits, age, gender, or family history impact a person's susceptibility to MS. Progress is being made every day and new treatments are on the horizon. "It is a huge motivating force and extremely rewarding to be able to see things that were just a concept at one point being applied every day in practice," says Dr. Oh. "I continue to balance research responsibilities with my clinical duties because it directly benefits the patients in front of me."

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This particular patient, Rona McGugan, has already been one to look on the bright side. She is certainly very thankful to have a leader in MS research and treatment such as Dr. Oh based right here in Canada. And she is optimistic that the tremendous progress made in MS treatment over the past 10 years has just begun.

"You can never lose hope," she says. "I'm thankful I'm in this treatment program because it's been a great help to me and I have hope that things will get even better in the future."

Gavin Davidson

Finding the Right Therapy Combination for MS Patients

Rona McGugan is a beacon of positivity. Although she suffers from multiple sclerosis (MS), a lifelong disease that requires multiple types of treatment, she has a good quality of life and hope for the future due to finding the right combination of therapies.

Through cutting-edge science and medicine, Biogen discovers, develops and delivers worldwide innovative therapies for people living with serious neurological and neurodegenerative diseases.

Founded in 1978, Biogen is one of the world’s oldest independent biotechnology companies.

WWW.BIOGENCAREFORMS.CA
Kayleigh has Rett Syndrome. At the age of 23 months, she then lost the ability to speak, to use her hands, and eventually to see, speak, and communicate. Her ability to think; they make it hard to see, speak, and communicate. Caring for a child with a neurodevelopmental disorder – like Rett syndrome – can consume the life of an entire family. When Kayleigh reached 18, she was discharged from five speech and language therapists, occupational therapists, physical therapists, and psychologists. The first step is for the Government of Canada to work with NHCC on the first-ever Canadian Action Plan for Brain Health. The Action Plan would spur research into desperately needed treatments and cures and would, by bringing people with brain conditions together with experts, finally develop health and non-health services to truly support those living with brain conditions, their families, and caregivers.

Steps Toward a Canadian Action Plan for Brain Health

The Canadian Traumatic Brain Injury Research Consortium is currently addressing these issues. The first step is for the Government of Canada to work with NHCC on the first-ever Canadian Action Plan for Brain Health. The Action Plan would spur research into desperately needed treatments and cures and would, by bringing people with brain conditions together with experts, finally develop health and non-health services to truly support those living with brain conditions, their families, and caregivers.

The good news is that significant progress is being made both in terms of bio-medical research and clinical care for patients with brain injuries. But much more needs to be done, from public education to active government leadership. The toll of thousands of brain injury patients and their families and caregivers deserves no less.
Tom Rideout was mid-conversation when he felt an intense pain in his head. The next thing he knew he was in the hospital, and learning he had suffered a stroke. At the age of 46, he was unable to speak or move the right side of his body. In the months that followed, Rideout found life to be unbearable. “I didn’t want to live because I felt useless,” he says, looking back 12 years. After suffering another stroke, he attempted suicide for a second time – this time saved by bystanders in the subway. “They asked me what was wrong and I just broke down in tears.”

Rideout turned a corner when he was put in touch with Stroke Recovery – Canada, a national service run through March of Dimes Canada. “I was put in touch with a woman who told me there was life after stroke.”

Rideout is just one of many stroke survivors who has found new lease on life through March of Dimes Canada, one of the largest community-based service providers for people with physical disabilities in the country.

Since the 1980s, the organization has fostered growing amounts of resources to help stroke survivors, a population that includes people of both genders and all ages. In fact, survivors of stroke comprise the highest percentage of people affiliated with March of Dimes Canada. With at least one Canadian suffering a stroke every 10 minutes – the incidence is higher in black and South Asian communities – there are about 400,000 survivors and that number is expected to grow due to Canada’s aging population.

One of Kolb’s most memorable talks was for a program in which survivors and their family members and caregivers were provided with support and care, and activities that promote emotional and social well-being.

“It gives us an explanation for how early experiences alter brain function,” says the 70-year-old Kolb. “Given my age, I see my role in assessing and treating survivors’ quality of life. We would like to see them lead independent lives free of activity, engagement, and meaning.”

To that end, the March of Dimes Canada Warmline, Stroke Recovery Canada Warmline: 1.888.540.6666.

Stroke Recovery Website: www.marchofdimes.ca/EN/ programs/src/Pages/src.aspx

Dr. Bryan Kolb played a founding role in the study of neuroscience. As a neuroscientist at the Canadian Centre for Behavioural Neuroscience (CCBN), Kolb’s primary interest are in brain development, brain plasticity, and brain changes over time, including after injury. A recipient of the Order of Canada, Kolb has published five books and more than 400 articles and chapters. In the process, and with the help of a pioneering faculty and research team, Kolb has turned the University of Lethbridge into a relative young institution currently celebrating its 50th anniversary, into a hotbed for neuroscience research.

Reducing the effects of early adversity on the brain

Over the past two decades, Kolb’s research has focused on understand how early experiences alter brain and behavioural development, in both positive and negative ways, including whether it is possible to intervene after negative events and reverse, or at least reduce, the effects of early adversity. “Our brains actually form using genes in the brain to be turned on or off, which organize local meetings, activities, and seminars providing practical and emotional support. Forty years after contemplating suicide, Rideout is dedicated to helping other stroke survivors rediscover the joy in life through Peer Entering Stages, a program in which survivors visit hospitals and support groups. “When I tell other survivors, I urge them not to give up. I tell them there is life after stroke,” he says. “No one knows better than me.”

Research Raises Hope for Reversing Neurological Effects of Early Adversity

Dr. Bryan Kolb Canadian Centre for Behavioural Neuroscience, University of Lethbridge

Tom Rideout, Stroke Survivor (March of Dimes Canada). Photo: March of Dimes Canada

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New Technologies for Healthy Aging and Better Brain Health

As Canada’s population ages, finding ways to support older Canadians in living full and independent lives is crucial.

GD-WELL is a pan-Canadian network of researchers, non-profits, industry, government, older adults, and caregivers that is harnessing the power of new technologies to provide unusual solutions for healthy aging.

“What I was fresh out of engineering school, I met a man who was caring for his wife who had early onset dementia,” says AGE-WELL Scientific Co-Director Dr. Pooja Viswanathan. “He was telling me about all the difficulties they had and he said, ‘Wouldn’t it be great if technology could help us solve these problems?’ That idea really stuck with me.”

Solutions for aging’s varied issues Today, AGE-WELL research teams are developing humanoids that can assist older Canadians with dementia in their homes by reminding people of tasks and routines, playing brain-strengthening games with them, and even acting as a reme avatar for medical professionals.

Another team is testing a smart glove which takes the same vibration-damping technology that stabilizes buildings against earthquakes, and uses it to reduce hand tremors from Parkinson’s disease and other movement disorders.

There’s a new tablet software that analyzes a person’s speech to detect and monitor movement disorders.

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