

Googling Concussion Care: A Critical Appraisal of Online Concussion Healthcare Providers and Practices in Canada

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Background: Concussion is an emerging public health concern, but care of patients with a concussion is presently unregulated in Canada.

Methods: Independent, blinded Google Internet searches were conducted for the terms “concussion” and “concussion clinic” and each of the Canadian provinces and territories. The first 10 to 15 concussion healthcare providers per province were identified. A critical appraisal of healthcare personnel and services offered on the provider’s Web site was conducted.

Results: Fifty-eight concussion healthcare providers were identified using this search methodology. Only 40% listed the presence of an on-site medical doctor (M.D.) as a member of the clinical team. Forty-seven percent of concussion healthcare providers advertised access to a concussion clinic, program, or center on their Web site. Professionals designated as team leaders, directors, or presidents among concussion clinics, programs, and centers included a neuropsychologist (15%), sports medicine physician (7%), neurologist (4%), and neurosurgeon (4%). Services offered by providers included baseline testing (67%), physiotherapy (50%), and hyperbaric oxygen therapy (2%).

Conclusions: This study indicates that there are numerous concussion healthcare providers in Canada offering diverse services with clinics operated by professionals with varying levels of training in traumatic brain injury. In some cases, the practices of these concussion clinics do not conform to current expert consensus guidelines.

Key Words: concussion, concussion clinic, healthcare provider, online, Google

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With proper education and conservative management, most patients with a concussion can be successfully managed by pediatricians, primary care, and sports medicine physicians with complete return to school and sport activities.^{1–3}

However, the management of patients with more severe injuries and postconcussion syndrome (PCS) is more challenging and often requires a multidisciplinary approach to address the unique manifestations of traumatic brain injury (TBI).^{4,5} Although the modern medical care of patients with moderate and severe TBI is performed by nationally licensed experts in emergency medicine, neurosurgery, critical care, rehabilitation medicine, and allied health subdisciplines, the care of patients with a concussion is presently unregulated in Canada.

To examine the magnitude of this issue, we conducted Google Internet searches to identify advertised concussion healthcare providers throughout Canada and performed a critical appraisal of the personnel and practices of these concussion healthcare providers.

METHODS

Using the World Wide Web, 2 authors conducted independent, blinded Google searches using the terms “concussion” and “concussion clinic” and each of the Canadian provinces and territories on the same day. The first ten (top 15 for Ontario) concussion healthcare providers were identified for each search. This study used information that was displayed on publicly accessible Web sites. Google searches were undertaken on 2 research computers that had not been used previously to search for concussion healthcare providers. Search histories were also cleared on each computer before initiating Google searches.

A critical appraisal of advertised healthcare services was performed for each provider as presented on the concussion provider’s Web site. The initial Internet searches and review of services were completed on May 12, 2015. Follow-up Internet searches were performed from June 6 to 15, 2015 to clarify the use of baseline and neurocognitive testing.

RESULTS

We identified 58 Canadian concussion healthcare providers (Table 1). Forty-seven percent of concussion

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TABLE 1. Summary of Canadian Concussion Healthcare Providers

	N (%)
Location	
British Columbia	
Victoria	1 (1.7)
Vancouver	5 (8.6)
Other	4 (6.9)
Alberta	
Edmonton	4 (6.9)
Calgary	3 (5.2)
Other	3 (5.2)
Saskatchewan	
Regina	3 (5.2)
Saskatchewan	0
Other	0
Manitoba	
Winnipeg	7 (12.1)
Brandon	0
Other	0
Ontario	
Toronto	4 (6.9)
Ottawa	4 (6.9)
Other	7 (12.1)
Quebec	
Quebec City	0
Montreal	4 (6.9)
Other	0
Nova Scotia	
Halifax	5 (8.6)
Cape Breton	0
Other	2 (3.4)
Newfoundland	
St. Johns	0
Mount Pearl	0
Other	1 (1.7)
Yukon*	
Whitehorse	1 (1.7)
Other	0
University affiliation	
Yes	9 (15.5)
No	49 (84.5)
Concussion “clinic,” “program,” or “center”	
Yes	27 (46.5)
No	31 (53.4)
Presence of an on-site medical doctor	
Yes	23 (40)
No	35 (60)
Members	
Sports medicine	14 (24.1)
Neurologist	4 (6.9)
Neurosurgeon	3 (5.2)
Rehabilitation physician	3 (5.2)
Pediatrician	4 (6.9)
Neuroradiologist	1 (1.7)

TABLE 1. (Continued) Summary of Canadian Concussion Healthcare Providers

	N (%)
Psychiatrist	2 (3.4)
Orthopedic surgeon	4 (6.9)
Family medicine	4 (6.9)
ER physician	1 (1.7)
Physiotherapist	34 (58.6)
Athletic therapist	15 (25.9)
Chiropractor	13 (22.4)
Neuropsychologist	16 (27.6)
Optometrist	3 (5.2)
Occupational therapist	7 (12.1)
Exercise physiologist/ kinesiologist	9 (15.5)
Massage therapist	19 (32.8)
Doctor of osteopathy	5 (8.6)
Speech language pathologist	3 (5.2)
Nurse	4 (6.9)

*Yukon only has 1 city with a population greater than 15 000.

healthcare providers advertised access to a concussion clinic, program, or center (Table 2). Concussion-related services offered by concussion healthcare providers are summarized in Table 3. Searches revealed 2 companies that offer concussion training.

DISCUSSION

The results of this study provide important insight into the current landscape of concussion healthcare across Canada and draw attention to a number of important concerns.

First, our study indicates that the number of concussion healthcare providers varies widely across Canada. Some provinces seem well serviced whereas the absence of

TABLE 2. Summary of Designated Team Leaders, Directors, or Presidents of Concussion Clinics, Programs, and Centers

Team Leader	N (%)
Unknown (not listed)	12 (44.4)
Neuropsychologist	4 (14.8)
Sports medicine physician	2 (7.4)
Athletic therapist	2 (7.4)
Physiotherapist	2 (7.4)
Neurosurgeon	1 (3.7)
Neurologist	1 (3.7)
Occupational therapist	1 (3.7)
Chiropractor	1 (3.7)
Social worker	1 (3.7)
Doctor of osteopathy	1 (3.7)

28 designated leaders, directors, or presidents for 27 concussion clinics, programs, and centers.

TABLE 3. Summary of Concussion-Related Services Offered by Concussion Healthcare Providers

Service	N (%)
Physiotherapy	29 (50.0)
Hyperbaric oxygen therapy	1 (1.6)
Baseline testing	39 (67.2)
ImPACT testing alone	14 (35.9)
ImPACT + other tools	5 (12.8)
Unspecified tools	20 (51.2)

ImPACT, immediate postconcussion assessment and cognitive testing.

identified providers in some provinces and territories may point to regions where more services are needed.

Second, our study indicates that concussion healthcare in Canada is currently offered by a wide spectrum of professionals with varying levels of clinical training and experience in TBI. There is strong consensus among concussion experts that all patients with a suspected concussion should undergo medical evaluation including a comprehensive clinical history, neurological examination, and determination of the need for neuroimaging to rule out a more serious TBI.⁶ Some authors suggest that sports medicine physicians, neurologists, and neurosurgeons should be available to provide detailed clinical assessments for these patients, whereas other clinical experts may also add value to these multidisciplinary teams.⁵ Alarming, the results of this study suggest that a substantial proportion of concussion healthcare providers do not have an on-site medical doctor (M.D.). In addition, a significant proportion of concussion healthcare providers have limited access to neuropsychologists, neurologists, and neurosurgeons who have clinical training in the assessment of patients with TBI. Many concussion healthcare providers also do not have access to sports medicine physicians, many of whom have nationally recognized training in the evaluation of acute sports-related concussion patients. Among multidisciplinary concussion clinics, programs, and centers, very few have access to the recommended complement of healthcare professionals needed to address the complex needs of patients with a concussion. Most worrisome is the finding that many healthcare facilities identified in this study offer access to specialized concussion healthcare provided by professionals such as chiropractors (22%), doctors of osteopathy (9%), and massage therapists (33%) who historically have held little or no role in the evaluation and management of patients with TBI.

Third, our study indicates that a multitude of services are currently offered by identified concussion healthcare providers in Canada. Neuropsychology experts agree that there is presently insufficient evidence to support the widespread use of baseline neurocognitive testing and that neuropsychologists are the only professionals with advanced neuropsychological expertise in the administration, interpretation, and psychometrics of these tests and thus are in the best position to conduct and interpret neuropsychological assessments.⁷ Despite these clear recommendations, 67% of concussion healthcare providers

advertised baseline testing on their Web site. Among providers that advertised baseline immediate postconcussion assessment and cognitive testing on their Web sites, only 21% identified a registered neuropsychologist as a member of the clinical team. These findings suggest that a substantial proportion of neurocognitive testing performed by concussion care providers in Canada is undertaken in direct opposition to evidence-based guidelines and performed by healthcare providers with suboptimal training in neuropsychological testing. Whether these providers are unaware of current evidence-based guidelines or are offering these services exclusively for profit could not be assessed by this study. One provider identified itself as a facility that offers hyperbaric oxygen therapy to patients with PCS⁸ despite insufficient empirical evidence to support the use of this intervention in this population.

Finally, our searches identified 2 companies that advertised training and certification programs for other concussion healthcare providers.^{9,10} Despite offering TBI-related training to other healthcare professionals, the present authors could not identify any specific on-site individual with nationally licensed training in a TBI-related subdiscipline (neuropsychologist, neurologist, or neurosurgeon) listed on either of these 2 Web sites. According to the Web sites accessed by our search strategy, there are presently over 100 healthcare providers in Canada who have received certified training by one of these private companies. Although concussion-related companies are certainly at liberty to grant anyone training or certification for the use of their products or resources, this certification is not synonymous with nationally licensed clinical training such as that provided by institutions such as the Royal College of Physicians and Surgeons of Canada, the Canadian Academy of Sports and Exercise Medicine, or the Canadian Physiotherapy Association. It is unclear whether patients and parents are capable of distinguishing between a concussion healthcare provider who has nationally licensed training in the clinical care of TBI patients and those that display a seal of concussion care certification on their Web site issued by a provider with no demonstrable nationally licensed TBI training of their own.

This study is limited by the fact that the searches and critical appraisal of concussion healthcare providers were performed on 1 day and according to information posted on the provider's Web site. It is possible that there are concussion clinics of high quality operating throughout Canada that were not included in our analysis because of our search restrictions or because they did not have a Web site. It is also possible that certain providers have engaged in marketing strategies that have influenced the likelihood of their clinic aggregating to the top of Google searches for concussion healthcare. This latter concern could not be assessed in this study.

Without any national or international guidelines addressing the requisite training needed to participate in the multidisciplinary care of patients with a concussion, our study confirms that concussion clinics are currently operating throughout Canada and are led by a wide range of healthcare professionals with varying levels of training in TBI. Public

awareness of the current standard of concussion care should be assessed with future studies.

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ERRATUM

Five-Year Experience with Screening Electrocardiograms in National Collegiate Athletic Association Division I Athletes: Erratum

In the article that appeared on page 369 of the September 2016 issue of the *Clinical Journal of Sport Medicine*, the Open Access icon was missing from the article. The copyright line should have read “Copyright © 2016 The Author(s) published by Wolters Kluwer Health, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.”

The article has been corrected online.

REFERENCE

- Fuller C, Scott C, Hug-English C, Yang W, Pasternak A. Five-Year Experience with Screening Electrocardiograms in National Collegiate Athletic Association Division I Athletes. *Clin J Sport Med*. 2016;26:369–375.