



Brain Bootcamp: Pre–post comparison findings of an integrated behavioural health intervention for military members with reduced executive cognitive functioning

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ABSTRACT

Introduction: Canadian Armed Forces (CAF) Service members (SMs) experience higher rates of mild traumatic brain injuries (mTBIs) and psychosocial risk factors such as mental health diagnoses, sleep disturbances, alcohol consumption, and post-concussion symptoms than Canadian civilians. Associated challenges with executive cognitive functioning (ECF) can significantly impede their performance, engagement, and deployability. To address challenges with ECF, an occupational therapist providing rehabilitation services to CAF SMs created and delivered Brain Bootcamp – an integrated behavioural health intervention for CAF SMs who sustained an mTBI or more serious traumatic brain injury (TBI) and had reduced ECF. Although anecdotal post-intervention feedback is favourable, Brain Bootcamp's impact on ECF in individuals with mTBI or TBI, mental health diagnoses, or both has yet to be determined. This study aimed to determine whether Brain Bootcamp improves cognitive performance, reduces mTBI- and TBI-related symptoms, and increases external aid utilization among CAF SMs with reduced ECF. **Methods:** We conducted a quasi-experimental study of clinical outcomes collected from 55 participants who participated in Brain Bootcamp. Measures used to determine changes in client ECF before and after the intervention included the Montreal Cognitive Assessment, Rivermead Post-Concussion Symptom Questionnaire, and External Aids Utilization Survey. **Results:** Statistically significant changes pre- and post-intervention were observed, including improved cognitive performance, reduced self-reported mTBI or TBI symptoms, and increased external aid utilization. **Discussion:** Brain Bootcamp may have a positive effect on ECF. Such improvements can enable CAF SMs to be operationally ready for military service and have greater overall well-being. Brain Bootcamp appears to be a promising ECF-enhancing intervention.

Key words: brain injury, Canadian Armed Forces, cognition, cognitive dysfunction, cognitive rehabilitation therapy; occupational therapy, concussion, executive cognitive function, mental health, mild traumatic brain injury, military, occupational therapy, rehabilitation, traumatic brain injury.

RÉSUMÉ

Introduction : Les membres des Forces armées canadiennes (FAC) souffrent de plus haut taux de traumatisme craniocérébral léger (TCL) et de risques psychosociaux tels que des diagnostics en santé mentale, des troubles du sommeil, des symptômes post-commotion cérébrale et une consommation accrue d'alcool que la population civile canadienne. Les défis associés au fonctionnement cognitif peuvent atténuer la performance, l'engagement et la capacité à déployer de manière significative. Afin de gérer les défis du fonctionnement cognitif, un ergothérapeute fournissant des services de réhabilitation aux membres des FAC a développé un Camp d'entraînement du cerveau – une intervention comportementale intégrée pour les membres des FAC ayant souffert d'un TCL, ou de TC plus sérieux, et dont le fonctionnement cognitif était diminué. Alors que la rétroaction post-intervention était favorable, bien qu'anecdotiquement, l'impact du camp d'entraînement du cerveau sur les individus avec TCL/TC/diagnostic en santé mentale doit être évalué. **But :** Cette étude cherchait à déterminer si le camp d'entraînement du cerveau améliore la performance cognitive, réduit les symptômes liés au TCL/TC et accroît le recours aux services parmi les membres des FAC. **Méthodologie :** Une étude quasi-expérimentale

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des résultats cliniques fut menée parmi 55 participants ayant pris part au camp d'entraînement du cerveau. Les mesures utilisées pour déterminer le changement du fonctionnement cognitif pré et post-intervention incluent l'Évaluation cognitive de Montréal (*MoCA*), le *Rivermead Post-Concussion Symptom Questionnaire (RPQ)*, et le *External Aids Utilization Survey (EAUS)*. **Résultats :** Des changements pré/post intervention statistiquement significatifs furent observés, incluant une performance cognitive accrue, des symptômes rapportés de TCL/TC réduits et un recours aux services accrus. **Discussion :** Le camp d'entraînement du cerveau semble avoir un effet positif sur les membres des FAC. De telles améliorations peuvent permettre une préparation opérationnelle au service militaire et un plus grand bien-être général. Le camp d'entraînement semble être une intervention prometteuse pour l'accroissement du fonctionnement cognitif.

Mots clés : blessures au cerveau, cognition, commotion cérébrale, dysfonctionnement cognitif, ergothérapie, fonctionnement cognitif, Forces armées canadiennes, réhabilitation, santé mentale, thérapie de réhabilitation cognitive, traumatisme craniocérébral, traumatisme craniocérébral léger.

INTRODUCTION

The Canadian Armed Forces (CAF) take pride in being a fit and ready military force. This necessitates that CAF Service members (CAF SMs) remain employable, deployable, and fit – physically, mentally, emotionally, cognitively, and spiritually.¹ High-risk activities, which can potentially result in injury, are commonly engaged in in military service, whether during physical training, in daily trade-related tasks, during overseas deployment, or in response to natural disasters. In many circumstances, CAF SMs individually and collectively are in positions in which there is a possibility of sustaining physical and psychosocial injuries, including those that affect their executive cognitive functioning (ECF). In the military context, compromised functioning in general, and more particularly ECF, can potentially result in decreased efficiency and effectiveness and increased risk of harm to self, the unit, and a CAF mission.

ECF is a complex construct involving neurocognitive domains such as response inhibition, cognitive flexibility, and working memory,² as well as attention, planning, problem solving, organization, and concentration.³ An individual's ECF can be adversely affected by physical and psychosocial variables either in isolation or in combination.⁴⁻⁷ Psychosocial variables that are prevalent at a higher rate in the military than civilian population include increased geographical isolation, alcohol consumption, mental health diagnoses (i.e., depression, anxiety, and posttraumatic stress disorder [PTSD]), chronic pain, and sleep disturbances.^{8,9} Reduced ECF can detrimentally affect all areas of life, overall function, and relationships.^{10,11}

Traumatic brain injuries (TBIs) and mild traumatic brain injuries (mTBI), also known as concussions, can also contribute to a decrease in one's ECF. mTBI is defined as a temporary change in brain functioning caused by an insult to the head with a period

of posttraumatic amnesia lasting less than a day.^{12,13} Moderate and severe TBIs include changes in brain functioning resulting from a head insult causing loss of consciousness, periods of posttraumatic amnesia lasting longer than a day, a period of hospitalization in an acute care facility, and often tertiary rehabilitation.¹²⁻¹⁴ The literature also suggests that the co-occurrence of mTBI or TBI and PTSD can arise from the same or separate traumatic incidents.^{4-7,11-17} Among CAF SMs deployed to Afghanistan between 2009 and 2012, 5.2% self-reported experiencing a mTBI,¹⁵ 21% of whom noted post-concussion symptoms (PCS; i.e., three or more symptoms related to mTBI lasting >3 mo).^{12,13,15} Comparatively, the US Military reports mTBI rates of 12%–22.8% and PCS rates of 15.8%–35%,¹⁷⁻¹⁹ and the UK Armed Forces report a 4.4% prevalence among deployed SMs.¹⁹ CAF SMs who experience a mTBI in combat may be at risk of developing career-limiting medical conditions.²⁰

Various interventions for treating mTBI symptoms have been studied within military populations.⁷ This is due, in part, to the increased prevalence of this injury during military conflicts.^{19,21} A systematic review by Cooper and colleagues⁷ examined existing literature on interventions for mTBIs and PCS in the US Military. The review isolated four categories of interventions: psychoeducation, cognitive rehabilitation therapy (CRT), psychotherapy, and integrated behavioural health treatments. Psycho-educational interventions have a good evidence base both as a treatment for mTBIs and as a supplement to therapies for mental health disorders.^{7,12} CRT, generally defined as therapeutic interventions designed to improve cognitive functioning and participation in activities that may be affected by difficulties in one or more cognitive domains,³ was also determined to be efficacious as an intervention for military personnel experiencing PCS. This finding is

consistent with literature on both civilian and military populations.^{3,7,11,12,22–24} Psychotherapy was noted to be minimally effective in mTBI rehabilitation.⁷ Notably, integrated behavioural health interventions, a combination of the aforementioned three intervention types, were found to be promising for military members with co-occurring mental health diagnoses.^{5,7}

Using a bio-psychosocial–spiritual approach, occupational therapists deliver clinical interventions with the therapeutic goal of enhancing function.²⁵ Cognitive sequelae after mTBI are addressed using remedial and compensatory approaches, including global and domain-specific strategies, environmental modifications, psychoeducation, and the use of assistive devices.^{7,11,14,15,24} Treatment of psychosocial dysfunction draws on integrative behavioural health interventions that involve health and lifestyle education.

Before 2013, the Canadian Forces Health Services model for mTBI treatment did not identify a role for the physical rehabilitation team including occupational therapy, because the focus at that time was in-theatre acute management.²⁶ This model did not take into account return to work beyond the acute period, monitoring of physical retraining, and symptom-specific rehabilitation interventions that are typically recommended in the tertiary rehabilitation of military populations.^{11–13,26} To address the service gap and support CAF SMs experiencing reduced ECF, an occupational therapist created Brain Bootcamp.

Brain Bootcamp

Brain Bootcamp is an integrated behavioural health intervention based on the dynamic interactional model for CRT.²⁷ Consistent with the evidence base, Brain Bootcamp is inclusive of health literacy education coupled with remedial and compensatory techniques such as deliberate internal and external strategies that aim to improve daily cognitive performance.

Brain Bootcamp consists of two 50-minute sessions per week for 6 weeks. Learning strategies (e.g., mnemonics, name games), goal setting, videos, and other interactive activities target working memory, reading, attention, communication, sleep, stress management, and organization (Table 1). Each session consists of a review of the previous one, review of take-home assignments, a presentation on a new topic, an instructor-led activity, and an opportunity for questions and sharing. Each participant is provided with a binder including all topic information, handouts,

Table 1. Brain Bootcamp Session Topics

What Is Memory?
All About Attention
External Aids: There's an App for That!
Organization and Planning
Reading and Remembering
Decision Making and Problem Solving
Communication
Memory Techniques
Sleep
Stress Management
Brain Food: Nutrition for the Brain and Body
Optional or one-on-one as needed:
Goal Setting
Tinnitus
Pain Management

activities, and a list of supplemental resources (i.e., educational media, app lists, and additional links to reliable information on select topics). Some activities are completed as a group with the aim of increasing interaction, facilitating discussion, or consolidating lecture information. Other activities are completed outside of the sessions and tailored to the participant's activities of daily living. Examples of take-home activities include reducing auditory and visual clutter in home and work environments to improve attention and organization, completing a sleep diary to assist with a sleep hygiene plan, journaling worksheets, using internal memory techniques to remember names at a mess dinner, thinking of communication skills while writing an email, or practicing prioritization and listing techniques to plan a home renovation.

Culture and context of the military was integrated to better reflect the occupational needs, strengths, and barriers of military members.²⁸ Adaptation of content included substituting activities that are traditionally used in CRT interventions, such as grocery shopping and clerical tasks, with occupations that are typical in the military environment.²⁸ Incorporating activities or topics such as radio communication, packing a kit for deployment, and sport scenarios increased the relevance of the content to the military context.²⁸ Brain stimulation activities, which have been found to be less effective than compensatory strategies at improving cognitive performance in those with mild ECF impairments, were not emphasized.²³

Purpose of the study

In this study, we aimed to determine whether the scores of study participants would change from before to after Brain Bootcamp intervention regarding cognitive performance, TBI-related symptoms, and external aids utilization. We hypothesized that CAF SMs would demonstrate increased cognitive performance and external aids utilization and reduced perception of mTBI- or TBI-related symptoms.

METHODS

Design

This quasi-experimental pretest–posttest study captured and analyzed clinical outcome data pre- and post-intervention.²⁹ Data collection was completed between January 2013 and June 2017 from CAF SMs participating in Brain Bootcamp by the occupational therapist who developed and delivered the program. Clinical outcome data were de-identified and analyzed. Findings were related to and validated by the occupational therapist.

Ethics

The study received ethical approval from the Health Research Ethics Board at the University of Alberta and received CAF Surgeon General Health Research Program endorsement.

Sample

Of 253 CAF SMs who sustained an mTBI or TBI and were referred to the occupational therapist between January 2013 and June 2017, 105 met the criteria to participate in Brain Bootcamp. The analysis included pre- and post-intervention scores on measures of cognitive performance, symptom severity, and external aid utilization collected from the 55 members who completed the intervention and outcome measures. For a more detailed description of the sample, refer to Table 2 and Figures 1 and 2.

Inclusion and exclusion criteria

Because the current evidence and accepted protocols for managing mTBI among military and civilian populations indicate that the majority of those who sustain a mTBI will see their symptoms resolve spontaneously,^{4,6,12} only those whose mTBI symptoms persisted beyond 3 months were offered an opportunity to participate in one of four to five Brain Bootcamp cohorts each year. Participation was voluntary, and participants were free to withdraw at any time. Written and verbal consent

Table 2. Sample demographics

Characteristic	n (%)%
Gender	
Female	8 (14.5)
Male	47(85.5)
Commissioned	
Yes	2 (3.6)
No	50 (90.9)
Missing data	3 (5.5)
Severity of TBI	
Mild	47 (85.5)
Moderate	4 (7.3)
Severe	4 (7.3)
Mechanism of Injury	
Fall	5 (9.1)
Sport	3 (5.5)
Combat	7 (12.7)
Training exercise	8 (14.5)
MVC	7 (12.7)
Work	7 (12.7)
Altercation	1 (1.8)
Other	2 (3.6)
Missing	15 (27.3)

Note: Percentages may not total 100 because of rounding. TBI = traumatic brain injury; MVC = motor vehicle collision.

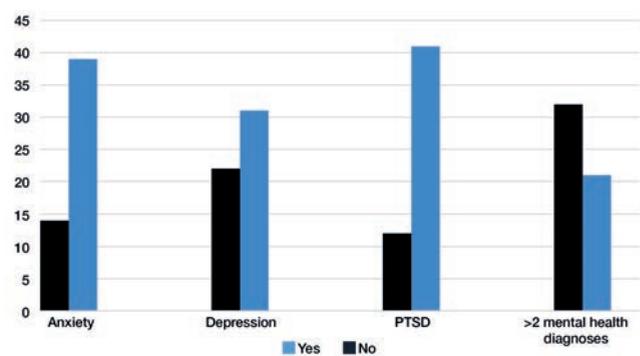


Figure 1. Number of Participants with Concurrent Mental Health Diagnoses by Condition

for participation were obtained from each participant as per departmental protocol and policy, after which clinical care was initiated. Screening for eligibility was conducted by the occupational therapist on the basis of the following criteria: the CAF SM (1) sustained a mTBI or a moderate to severe TBI and completed tertiary rehabilitation, (2) aimed to maintain and further develop

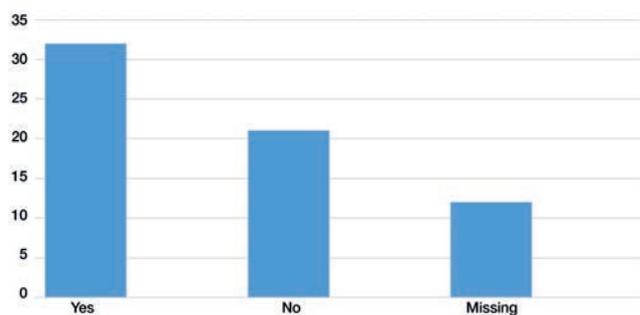


Figure 2. Presence of Concurrent Mental Health Diagnoses

ECF, and (3) is socially appropriate. For inclusion in the study, CAF SMs also had to have completed Grade 12 education or equivalent and attended at least 10 of 12 Brain Bootcamp sessions (83% of the program).

Outcome measures

Pre- and post-intervention changes were evaluated using outcome measure scores. Identified outcome measures were clinically recommended in best practice guidelines and were clinically feasible, easily administered, and available in English and French.¹² All outcome measures – the Montreal Cognitive Assessment (MoCA),^{30,31} Rivermead Post-Concussion Symptom Questionnaire (RPQ),³² and External Aids Utilization Survey (EAUS),³³ – were administered by the same examiner to increase reliability.

The 16-item MoCA measures cognitive performance across seven cognitive domains (e.g., visuospatial and executive functions, naming, memory, attention, language, abstraction, and orientation).³⁰ The MoCA is a standardized cognitive screen and has been used to measure ECF in specific and non-specific populations; it has been recommended in Canada for use with the civilian population with mTBI.^{12,30} A score of 26 out of 30 or higher correlates with “normal” ECF.³⁰ Because three English and French versions are available, the MoCA can be used as a repeated measure without a significant learning effect.³⁰ The RPQ is a screening tool used to assess self-reported severity of 16 physical, cognitive, and emotional symptoms over the previous 24 hours.³² The RPQ can be used as a repeat measure at any stage of mTBI recovery.^{12,32} Scores range from 0 to 56, with higher scores indicating increased perceived severity of symptoms. The 10-question EAUS, which aims to capture change in the implementation of external aids and strategies over time, assesses the extent to which individuals apply certain strategies (e.g., journaling, making

lists).³³ Scores range from 10 to 40, with higher scores indicating more external aid usage.³³

Data analysis

We conducted all analyses using IBM SPSS, Version 24 (IBM Corp., Armonk, NY). Differences in pre- and post-intervention scores were analyzed using paired-samples *t*-tests. Sample descriptives and frequencies were conducted. Study group differences were examined using χ^2 tests.

RESULTS

For sample demographics, refer to Table 2. Results of the paired-samples *t*-test analyses revealed statistically significant changes in pre- to post-intervention scores. Significant differences in test scores were also evident: MoCA pre-intervention (Mean = 25.05, *SD* = 2.21) and post-intervention (Mean = 27.24, *SD* = 1.86), $t_{54} = -9.009$, $p = 0.000$; RPQ pre-intervention (Mean = 29.47, *SD* = 14.98) and post-intervention (Mean = 21.56, *SD* = 12.63), $t_{54} = 5.12$, $p = 0.000$; EAUS pre-intervention (Mean = 41.90, *SD* = 9.93) and post-intervention (Mean = 48.62, *SD* = 6.12), $t_{38} = -4.814$, $p = 0.000$. Over the 6-week period in which participants took part in Brain Bootcamp, cognitive performance improved from mild cognitive impairment to normal, the number and severity of symptoms decreased, and the use of external aids increased.

The management and intervention pathways for the treatment of an mTBI versus moderate or severe TBI vary depending on the level of injury, impairment, patient needs, and other contextual factors.¹¹⁻¹³ Severe and moderate TBIs require an intense, prolonged, high-volume, and individualized rehabilitation process that often involves inpatient and tertiary care with a specialized multidisciplinary team.^{5,7,11,12}

Given that individuals who experienced moderate and severe TBIs had received similar interventions to Brain Bootcamp during inpatient or outpatient rehabilitation and often a greater time lapse since the mechanism of injury (MOI), we anticipated that they would have plateaued in their recovery and would find the Brain Bootcamp program less effective than participants with mTBI who had not received such interventions. For this reason, we examined differences pre- to post-intervention on the RPQ. Results of Mann-Whitney tests determined that there was a significant difference between individuals with moderate or severe TBI and those with mTBI on pre-intervention RPQ scores ($U =$

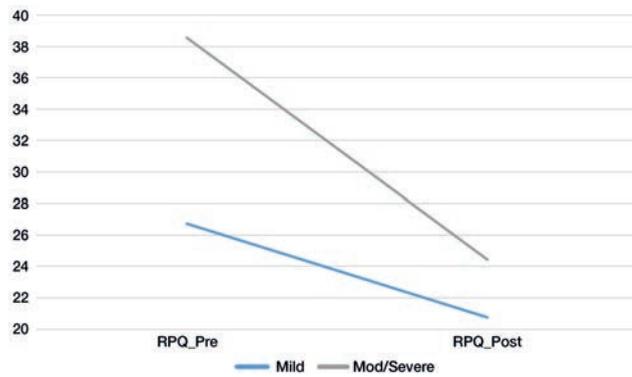


Figure 3. Pre- and Post-Intervention RPQ Scores by Severity of TBI

RPQ = Rivermead Post-Concussion Symptom Questionnaire; TBI = traumatic brain injury.

Table 3. Mechanism of injury and PTSD

Mechanism of injury	PTSD Absent	PTSD Present
Combat	2	5
Non-combat	27	5

Numbers do not equal complete sample size because the mechanism of injury for was not known for all participants. PTSD = posttraumatic stress disorder.

93.5, $p = 0.024$), but the difference between these two groups became non-significant post-intervention ($U = 161.5$, $p = 0.527$; Figure 3). A χ^2 test of independence was performed to examine the relation between the MOI (i.e., combat vs. non-combat) and PTSD (Table 3). The relation between these variables was statistically significant, $\chi^2_{1, N=43} = 9.396$, $p < 0.009$. A second χ^2 test of independence was performed to examine the relationship between the MOI – combat versus non-combat – and severity of the TBI (Table 3). The relationship between these variables was statistically significant, $\chi^2_{1, N=55} = 20.883$, $p < 0.000$. Individuals who sustained a head injury as a result of combat were more likely to have a formal diagnosis of PTSD and to have sustained a moderate or severe TBI.

DISCUSSION

Study findings indicate a clinically significant increase in cognitive performance, reduction in perceived mTBI or TBI symptoms, and increase in external aids utilization post-intervention among CAF SMs. Comorbid TBI and mental health conditions were noted in 60.5% of the CAF SM participants, which is elevated relative to the general CAF population.⁸ This is consistent with literature indicating

Table 4. Mechanism of injury and severity of TBI

Mechanism of injury	Mild	Moderate or severe
Combat	2	5
Non-combat	31	2

Numbers do not equal complete sample size because the mechanism of injury for was not known for all participants. TBI = traumatic brain injury.

that military personnel with increased psychosocial distress are more likely to experience PCS.^{4-7,11-17} Those who sustained mTBI or TBI in combat were more likely to have a diagnosis of PTSD and a TBI defined as moderate or severe (Tables 3 and 4) CAF SMs who sustained a moderate or severe TBI demonstrated a greater reduction in subjective symptoms post-intervention than those who sustained an mTBI (Figure 3).

As an intervention, Brain Bootcamp is consistent with current rehabilitation recommendations for TBI and PCS in military populations.^{11,34-36} Its objectives, format, topics, and activities also have similarities to other programs developed for US-specific military and Veteran populations who have sustained mTBIs.³⁴⁻³⁷ Promising interventions such as Brain Bootcamp that aim to improve ECF have the potential to have a positive impact on daily activities, work performance, and interpersonal relationships.

Challenges with ECF can make seemingly simple tasks problematic, including organizing and following through on daily routines, navigating within the community, and managing finances. Baseline levels of cognitive functioning are required to execute daily tasks, including management of medical conditions and adherence to medication regimes, appointments, and rehabilitation programs.³⁷ Success in these aforementioned tasks enable self-stabilization and regulation, which are foundational to more cognitively demanding activities.³⁷

With optimal ECF, CAF SMs are better positioned to reliably carry out scheduled tasks, duties, and responsibilities as well as to effectively engage with others. Regardless of one's trade, it is apparent that a high level of ECF is imperative for executing work-related duties in the military as well as maintaining healthy and productive relationships. Increased rates of error or unnecessary interpersonal conflicts are resource intensive and hazardous for members, their units, families, and missions. Optimal ECF is essential for maintaining safety,

efficiency, and effectiveness in day-to-day lives, workplace, and the overall organization.

The CAF structure, organization, culture, missions, and challenges warrant its own unique research, services, and programming. Although the current evidence-based literature regarding military populations from other North Atlantic Treaty Organization nations is helpful in guiding clinical practice, many factors among these international forces differ. It is interesting that the results of this analysis suggest similarities with literature on mTBI rehabilitation for military and Veteran populations in the United States.^{34–37}

Implications for practice and policy

This study has several implications for practice and policy. First and foremost, it offers preliminary evidence in support of an intervention that can be offered to individuals who have ECF dysfunction as the result of an mTBI or TBI and mental illness specifically in the CAF context. If further research into this intervention were to determine that widespread utilization was indicated, methods of service delivery could be more intentionally considered. Because group modalities are economical and beneficial to individuals experiencing challenges associated with ECF dysfunction, delivery in a group format may be worth considering. It may also be an effective means of identifying individuals who may require additional supports (e.g., mental health or psychosocial services). Although face-to-face delivery of Brain Bootcamp would be best for managing group dynamics, video conferencing may also be a delivery option, although it would require consideration of interprovincial licensing, security, and confidentiality directives. Access to up-to-date, evidence-based, and computerized cognitive assessments would also enhance the ability of CAF occupational therapists to assess specific cognitive domains, tailor individualized interventions; form educated opinions regarding cognitive fitness for military activities; and increase accuracy, reliability, and accessibility of data for research initiatives.

The delivery of Brain Bootcamp necessitates having professionals on interdisciplinary teams who are skilled at simultaneously managing the complexity of mTBI or TBI, mental health concerns, and multiple physical and neurological comorbidities from a functional perspective.

Holistic, occupation-centered research and practice is unique in this regard. More specifically, occupational therapists have specialized medical rehabilitation training and scope including cognitive assessment and

treatment in a functional context.^{25,37} As a result, they are ideally positioned to address CAF SMs who have impaired ECF.^{11,25,35–37} Inclusion of occupational therapists as integral members of the medical care team is consistent with other military health care models and evidence-based literature worldwide.^{11,25,36,37}

Study limitations

This pre–post quasi-experimental study had several limitations. The study lacked the rigour afforded by a randomized controlled trial and control group as the result of a number of factors. Because the type of intervention is already woven into widespread best practice guidelines for the management of mTBI and post-concussive sequelae, it would be challenging to receive ethical approval to delimit patients from receiving timely interventions that might positively affect their functional abilities and support more prompt resumption of work-related duties. Because the physical rehabilitation department was able to manage each patient referred for treatment, a wait-list control design was also not indicated. The sample was small and drawn from a single site, and a nonprobability type of sampling and self-selection were used. Moreover, the sample was based on the client data of 52% of those who initially participated in Brain Bootcamp, with data excluded because of reduced attendance or missing post-intervention outcome measures. Dropout and lower than 83% attendance was often due to the requirements of military duties such as training exercises in remote locations. As well, some members self-determined that they had recovered from their injuries sufficiently and did not require further rehabilitation.

Although the inclusion criteria successfully minimized the sample's heterogeneity, variability regarding trade, comorbidities, age, and mechanism, severity of, and time since injury remained. Regarding outcome measures, with the exception of the MoCA, the majority of the outcome measures used are non-standardized, although they are routinely used in clinical practice (i.e., the RPQ and EAUS).^{12,33} Although changes in pre- to post-intervention scores on outcome measures cannot infer causality, they suggest that further, more rigorous study of this promising intervention is warranted.

Future research

Brain Bootcamp appears to hold promise as an intervention in the treatment of ECF, so further research is indicated. Additional clinical trials of Brain Bootcamp

with longitudinal data collection using similar outcomes measures and return-to-duty, post-intervention work performance, and functional assessment data would further determine its impact. Brain Bootcamp may also be beneficial for CAF SMs experiencing issues with ECF as a symptom of mental health disorders such as PTSD^{4,7} or conditions independent of or unrelated to mTBI or TBI. The program's impact on such populations is worthy of exploration.

CONCLUSION

The CAF prides itself on being fit and operationally ready. High-risk activities inherent in military service, however, can compromise the health, well-being, and performance of CAF SMs. Because ECF is integral to engagement in daily tasks, its impairment can compromise effectiveness and increase risk to CAF SMs. Improvements in ECF, conversely, can benefit CAF SMs, their families, military units, and the whole CAF organization. Brain Bootcamp may assist in improving cognitive performance, reducing mTBI- and TBI-related symptoms, and increasing external aid utilization in CAF SMs exhibiting reduced ECF. A feasible, effective, and evidence-based intervention targeting ECF, it addresses a service gap in CAF clinical services. Delivery of Brain Bootcamp by occupational therapists as part of a comprehensive interdisciplinary ECF management plan for SMs with mTBI or TBI, mental health, and various other conditions is consistent with the current evidence base as well as with best practice models. Additional research is needed to further validate this intervention.

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