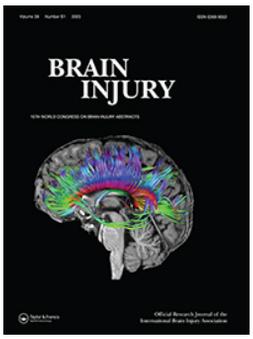

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65 Online Mindfulness, Yoga, and Psychoeducation for People with Traumatic Brain Injury: Feasibility, Acceptability, Usability, and Effectiveness of LoveYourBrain Mindset

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ABSTRACT

Objective: Mindfulness, yoga, and psychoeducation have been shown to improve cognitive, emotional, behavioral, and motor functioning after TBI, however, no online programming exists with these components.

Methods: This pre-post, retrospective study evaluated LoveYourBrain Mindset, a six-week online mindfulness, yoga, and psychoeducation program with weekly interactive Zoom classes and pre-recorded mindfulness tools. Two interactive class types (45-minute group discussion, 75-minute group discussion and gentle yoga) were offered to enhance accessibility. The curriculum focuses on a specific theme each week – resilience, mindfulness, intentions, realistic optimism, positive thinking, and gratitude. People were eligible for the study if they experienced TBI, were a caregiver, or clinician; ≥15 years old; capable of gentle exercise and group discussion; and signed up within a 1.5 year period. Self-reported data was collected on electronic eligibility and feedback forms. We analyzed attendance, program ratings, mindfulness tools utilization, and pre/post-intervention differences in the Quality of Life after Brain Injury overall scale and four TBI-QOL scales (Resilience, Emotional/behavioral dysregulation, Cognition, and Positive affect/well-being) using multiple linear regression.

Results: 1,539 individuals signed up for LoveYourBrain Mindset, including 1,093 (71.02%) who participated in one/more classes. 607 feedback forms were submitted (response rate=55.5%), including 411 from unique participants with TBI. These participants were a majority female (82.1%), white (87.5%), and ranged in severity (44.2% mild, 34.2% moderate, 21.6% severe), and a commonly reported experiencing anxiety (73.2%), sleep disturbance (57.4%), and PTS/PTSD (39.2%). Mean program rating was 9.09 (SD=1.28). A majority (62.99%) used the mindfulness tools each week. Multiple linear regression models controlling for age, severity, and gender indicated significant improvements in QOL, resilience, emotional/behavioral dysregulation, cognition, and positive affect/well-being ($p<0.001$).

Conclusions: LoveYourBrain Mindset is feasible, acceptable, usable, and may be effective at improving quality of life outcomes among people with TBI. Future research is necessary to determine the potential benefits of this program and how best to maximize the online delivery for greater access to high-quality rehabilitation services throughout the TBI healing journey.

72 Reborn - A Personal account

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ABSTRACT

On September 16, 2018, my medical career ended. It wasn't due to a terrible mistake with a patient's care or falsified tax returns. Nor was it a sudden epiphany of self-doubt in the face of a patient's tragedy. I had become accustomed to the onerous expectations of a professional life filled with clinical crises and administrative torment. I took my charmed life in Western Australia for granted. I was Australia's longest-ever serving Medical Director for organ donation.

Pride really does come before a fall.

On a damp, chilly morning, descending a steep, slippery road into Apollo Bay on the Great Ocean Road, I cycled head-on into a street sign. I don't remember any of the bad stuff—the broken neck, the brain damage, ventilated and restrained for a week while my family held a vigil at my bedside.

Time passed slowly. Six years.

I was sitting at a Brain Injury Conference in Sydney in May 2024, one I have spoken at in the past. I listened intently as esteemed medical presenters and inspirational patients spoke about brain trauma. I became angry, and I couldn't say why.

Then it struck me.

I am brain damaged, but I am not a patient anymore. I am registered as a doctor, but I am not a clinician anymore. It's time for me to leave the warm shelter that rehabilitation provided and stride out again into the world. That's what rehab really means. Getting back in the game.

We brain injury patients struggle for identity and meaning in our new lives. It turns out that each of us must decide who we are for ourselves.

I am a writer now, a rookie, a resident.

"The greatest ally of the physician is time," my first medical consultant used to recite before each ward round.

I remind myself of that incantation when the black dog interrupts my morning ocean swim. I won't ever be a doctor again, and I am acutely conscious that I am much luckier than other trauma victims.

I'm finally done trying to remember what happened yesterday; today and tomorrow are much more important.

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73 Management of Post-Concussive Neck Pain: A Systematic Review

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ABSTRACT

Background: Neck pain is a frequent symptom following concussion, often resulting in prolonged recovery and reduced quality of life. Despite its prevalence, there is no consensus on an effective therapeutic protocol. Management typically includes rest, physical therapy, NSAIDs, and more invasive interventions like facet joint and medial branch blocks. Identifying effective and standardized treatment protocol is essential for enhancing patient outcomes. This systematic review evaluates the effectiveness of various treatments for post-concussion neck pain to inform clinical practice.

Methods: We conducted a systematic search of PubMed, SPORTDiscus, Embase, and CENTRAL up to June 2024, using keywords such as "neck pain," "concussion," and "treatment" and their synonyms. Studies were included if neck pain was the main post-concussion symptom and physical examination and radiographic imaging were used to assess improvements. The single-patient case reports were excluded. Bias was assessed using Cochrane Risk of Bias 2 Tool.

Results: Database searches yielded 287 eligible studies, of which 123 were selected for full-text review. After applying the inclusion criteria, 23 studies of the highest significance were included in the final analysis. The main interventions evaluated were physiotherapy (n = 11, 47.8%), facet joint/medial branch blocks (n = 7, 30.4%), and chiropractic care (n = 4, 17.4%). One study (4.3%) investigated the use of NSAIDs. Moderate-quality evidence suggested that a combination of physiotherapy and at-home neck exercises is most effective for managing neck pain and increasing range of motion in patients 1-2 months following concussion. Low-quality evidence indicated that combining chiropractic spinal manipulations with physiotherapy may be more effective at reducing neck pain than physiotherapy alone. Limited evidence was found for the continuous use of NSAIDs. For patients with chronic neck pain (≥ 3 months post-concussion), facet joint and/or medial branch corticosteroids injections were recommended following physical examination. Patients receiving these injections experienced a significant reduction in pain relief, lasting for 14-16 weeks.

Conclusion: Clinicians should consider incorporating physiotherapy and at-home neck exercises into their treatment plans for patients with acute neck pain post-concussion. For chronic cases, facet joint and/or medial branch injections may be considered. Monitoring patients for treatment responses is crucial to optimize outcomes.

75 Estradiol Treatment in Rats with Combined Blast TBI and Hemorrhage

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ABSTRACT

Background: Blast traumatic brain injury (bTBI) is a series of complex mechanisms which is poorly understood due to 1) our incomplete knowledge of blast mechanism on the brain and other organs and 2) lack of effective treatment strategies. bTBI outcomes are often complicated by excessive bleeding or severe internal hemorrhage resulting in hemorrhagic shock (HS), depletion of cellular ATP, cell death, and multiorgan failure. Several clinical studies demonstrated that males have higher mortality rates and TBI complications than females. Estradiol reduces mitochondrial dysfunction by enhancing neuronal survival during periods of cellular stress through increased ATP production while promoting mitochondrial antioxidant enzymes. Therefore, utilization of estradiol in male rats with combined bTBI + HS is a novel avenue to examine its possible neuroprotective and mitochondrial mechanisms.

Method: Pre-clinical rat model of combined njury was generated in adult male rats by subjecting them to either 1) three repeated blast exposures of 20 PSI without HS or 2) blast + HS. Post-injury intravenous fluid resuscitation during the pre-hospital phase (T60-120) with β-Estradiol 3-sulfate sodium, 1 mg/kg body weight in 0.9% NaCl @ 5 ml/kg/hr. or normal saline (served as control) was used. Blood collected at baseline, T60 (after HS with or without blast), and T180 (end) was analyzed for blood chemistry, acid-base balance, metabolites, and mitochondrial complex I activity.

Results: An increased base deficit, plasma lactate, acidic pH <7.3, and depletion of mitochondrial complex I activity compared to baseline in all injured animals. The primary mechanisms of combined bTBI and HS were due to both lactic-acidosis and mitochondrial damage. Compared with normal saline, estradiol treatment significantly improved the acid-base imbalance but did not improve the depletion of complex I activity following bTBI with or without HS.

Conclusions: Complex 1 activity and plasma lactate can be used as a predictive systemic marker of the severity of bTBI. Additionally, estradiol's buffering effects can correct the acid-base balance without improving the mitochondrial damage. In addition to estradiol, other treatments targeted at mitochondrial damage might improve blast injury outcomes.

76 high-Amplitude Microsaccades May Serve as Biomarkers for Concussion

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ABSTRACT

The purpose of our research was to investigate if high-amplitude microsaccades identified during Videonystagmography (VNG) testing are correlated with concussion history. A total of 219 people, between the ages of 14 and 81, participated in this study. Of these 219 subjects, 64 reported no history of concussion while 155 reported a history of concussion were assessed with VNG looking for the presence of high-amplitude (abnormal) microsaccades. The VNG test battery included: Tracking / Smooth Pursuits, Saccades, Optokinetic, Gaze Testing, Spontaneous Nystagmus, Torsion Swing, Active Head Rotation, Positional Tests (Supine Head Center, Supine Head Left, Supine Head Right, Body Left, Body Right), Dix Hallpike and Caloric testing. Normal microsaccades are critically related to many aspects of visual perception, attention and cognition. On average, an individual executes about 1-2 microsaccades per second. For purposes of this study greater than 2 microsaccades per second was considered abnormal. After analyzing the sensitivity for each test individually we analyzed the percentage of subjects who demonstrated high-amplitude microsaccades. 88% of subjects with concussion demonstrated high-amplitude microsaccades in at least 1 of the above listed VNG tests. To simplify the assessment we identified the 3 highest sensitivity tests and created a 3-test cluster (gaze, saccadic, and positional testing). 78% of all subjects demonstrated high-amplitude microsaccades during at least 1 test of this 3-test cluster. Of those subjects who identified as having suffered from multiple concussions, 92% demonstrated high-amplitude microsaccades with our 3-test cluster. None of the subjects in the control group had a presence of high-amplitude microsaccades in any of the tests in the VNG battery, resulting in 100% specificity. Our 3-test cluster potentially represents a quick, fairly sensitive and highly specific form of screening for patients suspected of sustaining a concussion. The presence of abnormal, high-amplitude microsaccades on VNG assessment is highly correlated with history of concussion and can be used diagnostically by health care professionals to confirm the presence of a suspected concussion (100% specificity in our 64-person control sample) but the absence of high-amplitude microsaccades does not rule out concussion (78% sensitivity with the 3-test cluster).

77 Establishing the Role of the Brief Cognitive Assessment Tool in Evaluation of Cognitive Function After Recovery From Critical Illness

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ABSTRACT

Patients Discharged From The Intensive Care Unit (ICU) Experience Persistent Impairment in Physical, Cognitive, and Mental Health, Which Has Been Termed Post-Intensive Care Syndrome (PICS). The Brief Cognitive Assessment Tool (BCAT) is a Screening Test For Cognitive Dysfunction That is Unique From Other Tools in its Emphasis On Contextual Memory And Executive Control Functions. Abnormal Scores of Less Than 44/50 are Validated Predictors of Mild Cognitive Impairment and Dementia, As Well As Functional Deficits. Our Work is the First Reported Use of the BCAT For Evaluation of Cognitive Function in the Post-Critical Illness Setting.

This Was a Retrospective Single Center Study at an Academic Tertiary Care Center of Adult Survivors of the Medical or0 Surgical ICU With a Diagnosis of Polytrauma, Sepsis, and/or Respiratory Failure and ICU Stays >72 hours Who Completed Outpatient BCAT Testing Administered By a Trained Clinician at a Multidisciplinary PICS Clinic Visit Between May 2023-November 2023. Data Regarding Pre-Admission Characteristics and Functional Status, Medical History, Hospital Course, BCAT test Results, and Symptoms at Follow-Up Were Collected Via Retrospective Review of the Electronic Health Record. Two Sample T-Test and Wilcoxon Rank-Sum Test Were Used to Compare Parametric and Non-Parametric Characteristics.

A Total of 30 Patients Were Included (13 Medical and 17 Surgical). Eighteen (60%) Patients Had an Abnormal BCAT Score (<44), Though Only 12 (40%) Reported Subjective Memory or Concentration Difficulty. Patients With An Abnormal BCAT Were Older (61±15 vs 44±14 Years, p=0.004) and Less Likely to Be Working Prior to Hospitalization. There Were No Significant Differences in Co-Morbidities, Baseline Functional Status, Lengths of Stay, SOFA Score, Type or Duration of Cardiopulmonary Support, Analgosedation Exposure or Duration, Delirium Positive ICU Days, or Time From ICU Admission to Initial BCAT Test. The BCAT is a Useful Tool For The Multidimensional Assessment of Cognitive Function in Survivors of Critical Illness and is Easily Administered in an Outpatient Setting. Most Patients Demonstrated Abnormal BCAT Performance but Did Not Consistently Self-Report Symptoms of Cognitive Impairment. Differences in Overall Test Results Appear To Be Driven By Performance Variations in Subtests of Visuospatial Skills, Recall, and Memory

79 Nationwide Emergency Department Sample 2018 Older Adult Mild Traumatic Brain Injury Subsequent Visits – Relationships among Fall Mechanism of Injury, Payor, and Discharge Outcome

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ABSTRACT

Purpose: Mild traumatic brain injury (mTBI) is 90% of all traumatic brain injuries seen in U.S. emergency departments (ED). The "mild" classification of mTBI (same as concussion) masks the significant impact on the healthcare system and must include the contribution of increased aging populations. In the U.S., those aged ≥ 65 (older adults) with mTBI incur twice the costs compared to those aged < 65. Notably, older adults continue to experience symptoms 1-5 years after mTBI, negatively impacting their quality of life. Although associations between fall injury and older adults are reported, research on falls and ongoing mTBI symptoms in older adults is underdeveloped. Additionally, research on payor sources and discharge outcomes in older adults with mTBI is limited. The purpose of this study is to explore relationships among fall injury, payor sources, and discharge outcomes (referral to healthcare services) in individuals aged ≥ 65 with mTBI in subsequent ED visits.

Methods: The study is a cross-sectional design using secondary population data from the Nationwide Emergency Department Sample (NEDS) 2018 dataset. The descriptive analysis describes characteristics within mTBI subsequent visits. The logistic regression ascertains the relationship in mTBI subsequent visits among age, falls, payor sources (Medicare, Medicaid, private, other), and healthcare services.

Results: The study sample size is 4932. The significant associations include fall injury and referral to healthcare service visits ($p< 0.05$, $\chi^2_1=123.6$), and Medicare and referral to healthcare services ($p< 0.05$, $\chi^2_3=1059.9$). The odds ratio for populations aged ≥ 65 (OR 4.172, $p< 0.05$, CI 95% 3.427, 5.079), falls (OR 3.847, $p< 0.05$, CI 95% 2.649, 5.587), and Medicare (OR 4.492, $p< 0.05$, CI 95% 1.273, 2.106) have an increased probability of referral to healthcare services.

Conclusions: The findings support geriatric populations, falls, and Medicare carriers have an increased probability of being referred to healthcare services in those who are being readmitted to the ED for persisting symptoms after mTBI. Future research in fall prevention and aggressive medical monitoring after an initial mTBI, may inform current discharge models of care.

Clinical Relevance: Interdisciplinary collaboration to educate on mTBI and fall prevention is needed in individuals aged ≥ 65.

80 Optimizing neurobehavioral assessment of patients with disorders of consciousness (DoC) through the use of a comprehensive pre-assessment checklist

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ABSTRACT

There are numerous challenges to accurate assessment and classification of disorder of consciousness (DoC) because neurobehavioral presentation is prone to fluctuation and can be masked by confounding or co-occurring conditions. Assessing behavioral signs of consciousness in patients with severe brain injuries can be challenging and can lead to a misdiagnosis when no standardized assessment tool is used. Accurate behavioral assessment requires expertise on behalf of the clinician as there is no true measure of consciousness but rather an assessment of behavioral proxies. The accuracy of the assessment is, however, crucial clinically, legally, and ethically. It influences the way the patient's care will be oriented. Clinicians are challenged by the ambiguity and uncertainty that arises when assessing and treating individuals with DoC. The accuracy and consistency of these assessments are heavily influenced by the setting and environment in which they are conducted, the patient's positioning, confounding factors and their underlying medical conditions. It is thought that using a checklist to prepare the environment and the patient before conducting a behavioral assessment in individuals with DoC is crucial for ensuring the accuracy and reliability of the assessment. A checklist was developed over a period of three years by a group of interdisciplinary clinicians and researchers with expertise in DoC. Once finalized, the checklist along with a survey was sent to clinicians in various clinical settings with a diverse range of experience working with DoC. Participants were asked to utilize the checklist and provide feedback on its effectiveness. Clinicians found the checklist was useful and effective in optimizing patient and environmental conditions prior to completing a neurobehavioral assessment in patients with DoC. The results showed that use of a comprehensive evidence-based pre-assessment checklist may enhance consistency and accuracy of assessment of patients with DoC across the interdisciplinary team and may result in increased advocacy for access to necessary medical and rehabilitation resources shown to improve recovery.

81 "I lost all of them but honestly, they lost me": A Mixed Methods Investigation of Friendships in Acquired Brain Injury.

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ABSTRACT

Purpose: This study provides a comprehensive analysis of the complexities in friendships among people with traumatic brain injury (PwTBI). Here, friendships are broadly defined to include social friendships, as well as marital and spousal relationships. Previous research has explored how communication and identity changes after acquired brain injury (ABI) can impact the quality and quantity of spousal and social friendships. However, these studies do not fully depict the complexity of relationships. This study aims to address this gap by

investigating the changes in the relationships of PwTBI in order to deepen our understanding of the complex effects of ABI on friendships.
Methods: This investigation included 34 individuals from three different datasets. The Sydney Psychosocial Reintegration Scale - 2, which includes quantitative and qualitative questions about relationships before and after ABI, was administered to all participants across the three data sets. A mixed-methods approach was used to triangulate both quantitative and qualitative data related to friendships and spousal relationships.
Results: Every participant indicated changes in some relationships, such as, divorce (24%), marriage struggles (27%), lost friends (30%), changes in closeness (36%) and social network changes (42%). Interpretative phenomenological analysis identified six main themes including: families were the most stable relationships, changes in marital and romantic relationships, shifts in close friendships, changes in work relationships, distant and virtual friendships, and the formation of new support group friendships. Appraisal analysis indicated that the most evaluative language focused on significant other relationships, and that the quantity of friendships were impacted by the ABI, but often individuals maintained some high-quality relationships with close friends and family.
Conclusions: ABI results in changes in friendships and decreased social networks contributed to increased reliance on family members for support. Factors including changes to vocation, geographical location, and communication were all associated with changes and often losses of friendships. Re-engagement in meaningful activities is connected to reestablishing and maintaining friendships. ABI support groups and other community groups, online or in person, are a viable way to support quality friendships. There is a continued need to evaluate specific types of relationships to guide education of communication partners.

82 Detecting Mild TBI After Combat Deployment: Agreement Between Veterans Health Administration Clinical System and LIMBIC-CENC Research Protocol

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ABSTRACT

This study compares a standardized research process to an established clinical process for screening and diagnosis of historical mild traumatic brain injury (TBI) during combat deployment in a military/Veteran cohort. Using validated instruments, the Long-term Impact of Military-relevant Brain Injury Consortium-Chronic Effects of Neurotrauma Consortium (LIMBIC-CENC) prospective longitudinal study (PLS) screens for all potential concussive events (PCE) and conducts structured concussion diagnostic TBI interviews. The Veterans Health Administration (VHA) has a similar systematic screen followed by a comprehensive TBI evaluation (CTBIE). We assessed agreement between these two systems and identified features of Veterans negative clinically but positive in research.

VHA data were obtained from VA Informatics and Computing Infrastructure (VINCI) and linked to the LIMBIC-CENC PLS dataset. VHA screen positive for PCE was defined as a positive response for questions one and two (mechanism and immediate TBI signs/symptoms). The PLS identified more positive PCE screens during combat deployment (86% vs. 41%) than the VHA PCE screen with poor overall agreement (Kappa = 0.113). Participants had higher odds of being VHA-negative/PLS-positive if older age, female sex, more years of military service, more months combat deployed, Officer rank, or <50% service-connected disability rating; and lower odds if less education, higher combat intensity, or higher NSI scores. The LIMBIC-CENC PLS method also identified more Veterans with mild TBI during combat deployment versus the VHA CTBIE (81% vs 72%) with minimal overall agreement (Kappa = 0.311). Participants had higher odds of being VHA-negative/PLS-positive for mild TBI diagnosis if never married or Air Force; and lower odds if greater combat intensity.

Compared to the VHA system, the LIMBIC-CENC PLS research protocol identified higher PCE screening rates and more cases of mild TBI during combat deployment. Agreement was better for TBI determinations. Characteristics of PLS-positive/VHA-negative mismatches included demographic variables, military service variables, and current symptom levels. Further research is needed to better understand whether there is a clinical value to adjust the VHA TBI screening process and how these characteristics could be considered. Providers should be aware that some Veterans may have

undocumented, positive mild TBI histories even if they underwent screening and/or CTBIE processes.

83 "Why Aren't You Better Yet?": Deriving A Grounded Theory About Healthcare Experiences of Individuals With TBI

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ABSTRACT

Purpose: This study sought to develop a grounded theory related to the experience of individuals with mild-severe traumatic brain injuries (TBI) across the rehabilitation continuum (i.e., acute, subacute, and chronic phases of recovery). Specifically, this was focused on perceptions towards providers and perceived quality of care across phases of recovery.

Methods: Sixty-four individuals completed the mCARE-TBI, a patient reported experience measure (PREM) distributed via Qualtrics to individuals with TBI in the US and Canada. The present study only examined the open-ended responses, which were optional on this survey. Grounded theory was used to generate a theoretical model addressing perceptions of lived experiences within the healthcare and rehabilitation contexts specific to TBI.

Results: Three main categories were derived from qualitative analyses, including positive characteristics, neutral, and negative characteristics of providers. Positive characteristics included themes of collaboration, empathy and attitudes, strong communication skills, and being knowledgeable. Neutral characteristics included themes of having knowledge and providing adequate care. Negative characteristics included themes of poor communication and limited knowledge, being unprofessional and lacking empathy, and being dismissive and neglectful. Several sub themes were associated with each of these themes. These sub themes, which form the basis of suggestions for providers, will be discussed in our presentation. Grounded theory contributed to a model, which included characteristics of effective or "present" providers versus ineffective or "absent" providers.

Conclusions: While past research about the perceptions of individuals affected by TBI towards providers, across the recovery continuum, has identified the frustrations faced with providers, particularly in the chronic phase of recovery, there has been limited productive movement regarding development of adaptive strategies. The model developed in this study identifies specific suggestions for providers, primarily derived from subthemes, which could be used to develop provider training. The specific suggestions include things that providers should incorporate and avoid, as they interact with people with TBI.

85 Milder Ratings of Depression Are Correlated With Lower Figural Fluency Scores in a Sample of Adults With Moderate to Severe Traumatic Brain Injury.

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ABSTRACT

Introduction: Several studies have suggested that higher levels of depression are associated with lower scores on neuropsychological tests. However, consistent with the strong association between right hemisphere damage (RHD) and anosognosia, an under-endorsement of depressive symptoms in individuals with RHD from stroke has also been reported. This suggests that an underreporting of depression may occur in individuals with signs of RHD on neuropsychological testing. The current study examined whether depression ratings were correlated with cognitive test scores in individuals undergoing neuropsychological testing for traumatic brain injury (TBI).

Methods: Individuals (age range 20 to 38 years) with complicated mild, moderate, or severe TBI and demonstrated intracranial pathology on CT scan (CT+) were compared to a second age- and education-matched sample consisting of mild TBI with negative CT scans (CT-). Exclusion criteria were for pre-morbid psychiatric illness and/or suggestion of malingering on a formal test of effort. The severity of depression was measured with the Beck Depression Inventory-II (BDI-II), with higher scores reflecting higher levels of depression. Cognitive variables examined were tests of processing speed and generative output: Coding from the Wechsler Adult Intelligence Scale-IV (WAIS-IV), phonemic and semantic word generation, and figural fluency [output (FF output) and perseverative error (FF error) scores], using an adaptation of the Ruff Figural Fluency Test.

Results: There were no significant differences in the test scores of the CT+ ($n = 16$) and CT- ($n = 16$) groups. In the combined sample ($N = 32$), the only significant ($p < .05$) correlation found between depression ratings on the BDI-II and cognitive variables was for FF output ($r = .43$, $p = .01$), with a positive correlation indicating a relationship of lower non-verbal fluency scores to lower levels of depression. Similarly, in CT+ ($n = 16$), there was a significant correlation of FF output with depression ($r = .75$, $p = .0009$). In CT- ($n = 16$), this correlation did not emerge. Glasgow Coma Scale (GCS) scores in CT+ were correlated with scores on Coding ($r = .48$. $p = .06$), FF output ($r = .44$, $p = .09$), FF errors ($r = -.50$, $p = .05$), and BDI-II scores ($r = .48$, $p = .06$).

Conclusion: This study suggests that lower reporting of depressive symptoms in examinees with intracranial injury is correlated with lower GCS scores and signs of RHD on neuropsychological testing, consistent with studies showing less awareness of depression, or "nondysphoric depression" in individuals who have had right hemisphere strokes. This result is also consistent with the findings of an increased incidence of

alexithymia – an impairment of emotional awareness – following TBI. Future research will increase the sample size and consider variables such as outward affect, activity level, and treatment medications in data interpretation.

86 See Survivors as More than Participants: Figuring out Public and Patient Involvement (PPI) in Brain Injury Research – The Story so Far

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ABSTRACT

There is an emerging field of practice in health research to involve patients in the research that impacts their lives. This process, called Public and Patient Involvement (PPI), is gaining traction. PPI empowers members of the public and those with lived experience to participate and collaborate with researchers. Many funding agencies have PPI as a funding requirement.

ABI researchers are beginning to navigate their way in this PPI world. Patient organisations play a vital role. Acquired Brain Injury Ireland, as a national organisation has been working in multiple ways to engage people with brain injury in ABI research both within our organisational structures and with external research partners. As a new area of work, we are often learning by doing. Researchers are also in the same position. Together we are creating a number of methods for best practice PPI.

Internally, we have invested time and resources to ensure that people with ABI and their families are represented on our research structures. We have two experts by experience on our Research Ethics Committee. We engaged over a hundred people with ABI and their families in our research prioritisation exercise, the largest stakeholder voice in the consultation process. At our annual research conference, an expert by experience is included on the programme. We have facilitated two researchers with lived experience of TBI and stroke to complete their research projects (PhD and MSc.) and achieve publication.

Externally, we are working with several academic institutions. This includes supporting PPI as a core feature of a TBI study in Dublin City University. With seed funding, the Irish Critical Care Clinical Trials Hub in University College Dublin worked with us to develop an ABI PPI panel. We are collaborating with researchers in Trinity College Dublin to recruit PPI representatives for an interdisciplinary TBI research programme. We have a PPI representative on an international TBI outcomes research project in the University of Toronto.

We are capturing learning and identifying the barriers and enablers. The barriers include the limited knowledge and know-how and the lack of resources to support people with ABI and their families to participate (for e.g. funding for travel, stipends and accessibility requirements). There are several enablers to this work including ethical recruitment and retention, meaningful engagement, balancing expectations and ambitions, making the process accessible and ensuring equitable communications.

People with ABI have a limited voice in ABI research discourse. Our experience of PPI to date illustrates its value and potential. There is work to be done to make it systematic, sustainable and embedded in research practice requiring commitment from all stakeholders. The landscape of ABI research will have to be open, flexible and willing to change the power dynamics.

87 Mild TBI and Blast Exposure Affect Cognitive Function through a Neurobiological Pathway in Veterans

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ABSTRACT

Background: Posttraumatic stress disorder (PTSD), mild traumatic brain injury (TBI), and blast exposure are associated with long-term cognitive outcomes in Veterans. Despite overlap in symptoms and frequent co-occurrence, work suggests that these conditions and exposures affect cognition independently. The present analysis identifies neurobiological pathways by which PTSD, mild TBI, and blast exposure affect neuropsychological functioning long-term.

Methods: Participants were 181 US combat Veterans (88% male, M age=41.60 years). Lifetime PTSD diagnoses, TBI, and blast exposure histories were obtained through structured clinical interviews. Cognitive function was assessed using neuropsychological testing, and functional brain connectomes were mapped using magnetoencephalography. Linear regression analyses identified factors influencing cognitive function, including connectome metrics, deployment-related TBI, blast exposure, PTSD, and their interaction effects.

Results: Results identified two connectome metrics that influenced outcomes in the presence of blast exposure. Significant conditional effects were present for Maximum K Core and attention (B=-0.12, p=.004) as well as the proportion of Alpha band connectivity and complex attention (B=-10.97, p=.042). Both effects followed the same pattern: performance was better on cognitive tests as each connectome metric increased, and this effect was stronger as blast severity increased. The relationship between TBI and cognition was dependent on two connectome metrics. The conditional effect was significant nodes and general ability (B=-0.25, p=.007), degree and general ability (B=-4.46, p=.009), as well as degree and perceptual reasoning (B=-3.25, p=.002). Interaction effects followed a similar pattern, such that when TBI as absent, performance was better as connectome metrics increased. However, when TBI was present, performance was poorer as connectome metrics increased. Adjusted main effects demonstrated that several aspects of the functional connectome were

directly associated with cognitive outcomes. Modularity was positively associated with perceptual reasoning (B=16.05, p=.028). Alpha frequency was positively associated with processing speed (B=2.49, p=.049) and full scale IQ (B=9.73, p=.031). K Core Degree (B=-1.53, p=.002), rich Club metrics (B=-5.75, p=.006), and connection strength (B=-0.71, p=.004) were negatively associated with verbal fluency, among other cognitive outcomes.
Conclusions: These findings demonstrate that the relationship between the brain's functional connectome and cognitive function is different in individuals with blast exposure and TBI history, independent of the presence of PTSD and effects of other covariates like age, education, and racial/ethnic background. This suggests that blast exposure and TBI affect cognition through a distinct neurological pathway, potentially representing effects of neurotrauma. This highlights the potential for targeted treatments aimed at normalizing the connectome to improve cognitive function in Veterans with a history of blast exposure or TBI.

88 The Polytrauma Clinical Triad: A Comparison of Women Survivors with and without Traumatic Brain Injuries due to Intimate Partner Violence

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ABSTRACT

Objective: Women survivors of intimate partner violence (IPV) often experience traumatic brain injury (TBI) due to IPV, report neurobehavioral symptoms, and experience posttraumatic stress disorder (PTSD) and chronic pain. The cooccurrence of neurobehavioral symptoms, PTSD, and chronic pain has previously been defined as the polytrauma clinical triad among Veterans, but the triad has not been studied among women survivors of IPV. This study examined the rates of neurobehavioral symptoms, PTSD, chronic pain, condition dyads, and the polytrauma clinical triad among a sample of women survivors with no lifetime history of TBIs and women with IPV-related TBIs.
Methods: Cisgender women were recruited using Prolific, an online recruitment platform (N=198; M=39.6 years-old, SD=11.9; 83.3% White, 82.9% non-Hispanic; 59.1% college-educated). All participants reported a history of physical or sexual IPV, with 53.0% (n=105) reporting at least one prior IPV-related TBI. Among women reporting TBIs, most reported mild TBIs (90.5%), with their most recent injury occurring more than one year ago (92.4%). All participants completed the Neurobehavioral Symptom Inventory (NSI) and PTSD Checklist for DSM-5 (PCL-5), and additionally, self-reported their pain frequency and duration (i.e., pain most days for ≥ 3 months qualified as chronic pain).
Results: Women with IPV-related TBI were more likely to report chronic pain (43.8%) than women survivors of IPV without a lifetime history of TBI (29.0%) (p=.045, OR [95% Confidence Interval]=1.87 [1.01, 3.43]). However, rates of neurobehavioral symptoms and PTSD did not differ across groups. For condition dyads, women with IPV-related TBI were more likely to meet criteria for dyads that included chronic pain: chronic pain with concurrent neurobehavioral symptoms (p=.030, OR=2.01 [1.07, 3.79]) and chronic pain with concurrent PTSD (p=.009, OR=3.84 [1.41, 10.46]). Similarly, women with IPV-related TBI were more likely to meet criteria for the polytrauma clinical triad (19.0%) than women survivors without TBI (6.5%)(p=.009, OR=3.84 [1.41, 10.46]). All analyses controlled for age and education, but when additionally controlling for physical and sexual IPV severity, all group differences became nonsignificant.
Conclusions: The current findings suggest that, compared to women survivors of IPV without lifetime history of TBI, women survivors with IPV-related TBI are more likely to meet criteria for the polytrauma clinical triad regardless of age and education. IPV severity explained the relationship between TBI history and mental and behavioral health symptoms, suggesting that IPV severity is closely linked to both risk of TBI and elevated symptomatology in this population. Results also suggest that chronic pain may be the largest contributor to the polytrauma clinical triad among this population, highlighting the importance of incorporating pain management into interventions for women survivors of IPV.

93 Perceived Met, Unmet, and Undermet Needs of Individuals Living with Traumatic Brain Injuries: A Grounded Theory Approach.

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ABSTRACT

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Purpose: The authors sought to identify the perceived met, unmet, and undermet needs of individuals living with traumatic brain injuries and their family members within a Midwestern state as part of a required state needs assessment.
Method: Participants were recruited at the annual state support group summit and by reaching out to virtual support groups. Participants completed the OSU-TBI form, a demographic questionnaire, the SPRS-2, and then a qualitative interview. Family members were included in the data collection process and participated in the interviews as necessary to support communication of the individuals with TBI. Demographic and SPRS-2 score data were reported providing descriptive information on changes in participation and relationships post injury. This data is augmented by qualitative responses on the SPRS-2 describing these changes. Interview data was analyzed using a grounded theory approach to code key statements, identify clusters of meaning and highlight the salient experiences of the individuals in various contexts and situations. Each interview was coded separately by at least two members of the research team (authors) and all authors have expertise and training in qualitative analysis.
Results: 34 individuals with TBI (15 female and 19 male) between the ages of 30 and 84 years old participated in the

study. Their injuries ranged from mild to severe (8 mild, 10 moderate, 12 severe, and 4 non-traumatic etiology). The time post injury onset of the participants ranged from 4 months to 62 years (M = 11.24, SD = 12.67). The injury onset ages of the participants ranged from 16 to 60 years old (M = 44, SD = 12.96). 91.2% of the participants identified their race/ethnicity as white, while 8.8% identified as Black or African American. In terms of educational background, 4 participants finished high school, 3 completed some college, 10 had earned an associate's degree, 12 attained a bachelor's degree, 3 completed a master's degree at the graduate level, and 2 had obtained a doctorate degree. The average length of interviews was approximately 71 minutes (range = 44 - 109 minutes; standard deviation = 22.76). Data analysis and coding of qualitative interviews is currently underway and will be available for report by March 2025.
Conclusion: This work highlights the importance of efforts to understand the lived experiences of individuals with TBI and has implications for healthcare providers, family members, and others who may interact with those who have experienced a TBI. The public health burden of TBI is great, thus the need for this state based assessment, and this study provides valuable insight into the services and supports needed for individuals with TBI. Future endeavors should involve the creation of resources and programming that meet the needs of these individuals and their families.

94 IGF-1 as a Biomarker for Symptom Severity in Adolescents with Traumatic Brain Injury

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ABSTRACT

Objectives: The purpose of this study was to assess the relationship between insulin-like growth factor 1 (IGF-1) level and symptom severity following traumatic brain injury (TBI) in adolescents. Specifically, the study evaluates whether IGF-1 levels correlate with post-injury symptom severity, depression, and anxiety.
Design: This retrospective observational study included adolescents aged 13-17 years (n=52) with mild TBI (mTBI, n=30) or moderate-to-severe TBI (msTBI, n=22) based on Glasgow Coma Scale scores. Participants were 3-12 months post-TBI and had available IGF-1 values along with complete Rivermead Post Concussion Symptoms Questionnaire (RPQ-13), Generalized Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire-9 (PHQ-9) responses. Age and gender were standardized using IGF-1 z-scores. Demographic and clinical characteristics including age, sex, BMI, race, mechanism of injury, psychiatric history, time to clinic presentation and lab draw were compared between the mTBI and msTBI groups using either Fisher's Exact Test or the Median Two-Sample Test. Outcome measures included intergroup comparison of RPQ-13, PHQ-9, and GAD-7 scores, which were then correlated to IGF-1 z-scores using Kendall's Tau analysis.
Results: Data showed that the msTBI group mean age was one year younger than those with mTBI (p=0.0179). Differences between participant BMI, sex distribution, race, mechanism of injury, psychiatric history, time to clinic presentation, or time to lab draw were nonsignificant between mTBI and msTBI. Median post-injury RPQ-13 and GAD-7 scores were significantly higher in the msTBI group compared to mTBI (p=0.0472 and p=0.0085, respectively), while PHQ-9 scores approached but did not reach significance (p=0.0762). Kendall's Tau analysis demonstrated significant negative correlations between IGF-1 z-scores and RPQ-13, PHQ-9, and GAD-7 scores. IGF-1 z-scores were strongly and negatively correlated with RPQ-13 scores in both mild (tau=-0.65, p<0.0001) and moderate-to-severe (tau=-0.85,p<0.0001) TBI groups, suggesting that higher IGF-1 levels were associated with lower post-injury symptom severity. Similarly, a negative correlation was observed between IGF-1 z-score and GAD-7 score in both mild (tau=-0.30,p=0.0302) and moderate-to-severe (tau=-0.39,p=0.0144) TBI. In contrast, only the msTBI group demonstrated a significant negative correlation between IGF-1 z-score and PHQ-9 score (tau=-0.82,p<0.0001), while the mild TBI group did not reach statistical significance (tau=-0.14,p=0.3104).
Conclusions: In this study, the msTBI group had higher RPQ-13 and GAD-7 scores, suggesting that in adolescents, brain injury severity may affect the degree of post-injury symptom severity and anxiety experienced as compared to those with mTBI. Results further suggest that a low IGF-1 level post-injury correlates to greater degree of post-injury symptom severity and anxiety in both mTBI and msTBI. Only the msTBI group showed a similar strong and negative correlation between IGF-1 z-score and degree of post-injury depression. This study presents compelling support for IGF-1 as a potential biomarker in adolescent TBI, particularly for post-injury symptom severity and neuropsychiatric impact, though additional investigation is needed.

96 Concussion Best Practice Guidelines for Return to Activity and the Role of Occupational Therapy: Effects of an Education Module for Medical Students

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ABSTRACT

Purpose: In order to optimize recovery from concussion, promote return to activity, and prevent medical complications, best practice guidelines have been developed and implemented that emphasize a gradual return to activity (Patricios et al.,

2023). Despite the importance of best practice guidelines, literature suggests that physicians may have difficulty translating best practice guidelines into clinical practice (Arbogast et al., 2013) and may not consistently communicate best practice return to activity guidelines to patients and families (Seabury et al., 2018; Weerdenburg et al., 2016). Education regarding return to activity following concussion that is developed from the perspective of an occupational therapist has the potential to offer a unique perspective that might not traditionally be included in medical school curricula. The purpose of this study was to explore the effects of an education training module on medical students' knowledge and perspectives of concussion best practices for return to activity and the role of occupational therapy.
Methods: Medical students at a private Osteopathic Medicine School participated in an educational training seminar on best practices for return to activity following concussion and the role of occupational therapy. A pre and posttest with open and closed ended questions were used to evaluate the effects of the training program. A paired t test to determine if there was a statistically significant difference on the Concussion Knowledge assessment following the educational seminar.
Results: There was a significant difference in the scores for pre-knowledge assessment score (M = 8.13, SD = 1.76) and post-knowledge assessment total score (M = 10.68, SD =1.9); t(55) = -8.5, p = <.001. Medical students demonstrated improved scores on post-test knowledge assessment of concussion and best practices related to return to activity and reported that they were more aware of the importance of gradual activity, aerobic exercise, and interdisciplinary collaboration, including referral to occupational therapy.
Conclusion: The results indicate that an educational training on concussion, gradual return to activity, and the role of occupational therapy may improve medical students' knowledge of best practices for management of concussion.
References: https://docs.google.com/document/d/1jVsvXo2-Y50fOlfzege71UQtzXylVzsk0Dof2d3D44k/edit?usp=sharing

97 Participant Characteristics and Outcomes of Advanced Postacute Brain Injury Rehabilitation for Brain Injury due to Hypoxia

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ABSTRACT

The few prior studies examining rehabilitation for individuals with brain injury due to hypoxia focused on inpatient rehabilitation. This is the first study to examine admission and outcome data in advanced postacute rehabilitation settings in comparison to participants with TBI and stroke.
Methods: Retrospective analyses of de-identified data from a nationally representative consortium of U.S. postacute brain injury rehabilitation providers for participants in postacute Residential, Home and Community, Day Treatment, and Outpatient rehabilitation programs. Data include 64 participants with hypoxia, 583 with TBI, and 801 with stroke.
Results: Significant differences in age were detected when comparing the participants with hypoxia (mean=45, sd=16) to participants with stroke (mean=58, sd=13), but not TBI participants (mean=44, sd=16) (F=138.91, p<.001). Significant differences in sex were also present with the hypoxia sample having a larger proportion of female participants (39.5%) than the TBI (28.5%) and stroke samples (28.1%) (2=19.2, p<.001). No significant differences were detected when comparing the hypoxia group to TBI and stroke participants on time post-injury and length of stay. On average, participants with hypoxia scored significantly worse at admission and discharge than those with TBI and stroke on the Mayo-Portland Adaptability Inventory (4th edition) MPAI-4 Total score (admission F=12.62, p<.001; discharge F=15.54, p<.001) and most indices and subscales: Ability (admission F=8.13, p<.001; discharge F=14.15, p<.001), Adjustment (admission F=35.17, p<.001; discharge F=12.41, p<.001), Participation (admission F=16.10, p<.001; discharge F=20.17, p<.001), and Cognition (admission F=26.12, p<.001; discharge F=16.01, p<.001). Significant differences between hypoxia and TBI participants were detected on the Physical (admission F=54.10, p<.001; discharge F=54.46, p<.001) and Autonomy subscales (admission F=34.20, p<.001; discharge F=23.83; p<.001), but not between hypoxia and stroke groups. Although significant differences were detected between admission and discharge across the Total score and all indices and subscales for the hypoxia group (indicating improvement), the rate of improvement varied by injury type. Significant differences in rate of change between admission and discharge were detected between the hypoxia and TBI groups on the Total MPAI-4 T-score (F=13.96, p<.001) as well as T-scores for the Ability (F=12.27, p<.001) and Adjustment indices (F=13.58, p<.001) with all differences showing more improvement in the TBI group. A significant difference in rate of change between admission and discharge was detected between the hypoxia and stroke groups on the Autonomy subscale with the hypoxia group showing a smaller rate of change (F=6.35, p=.002). However, effect sizes for these differences in rates of change were small and no significant differences were detected

between the groups on the Participation index and the Physical and Cognition subscales.
Conclusions: Individuals with brain injury secondary to hypoxia benefit from advanced postacute brain injury rehabilitation. Outcomes are similar to or only slightly less than participants with TBI and stroke.

99 Complexity of Post-Concussion Syndrome Assessment and Management - A Case for Individualizing Rehabilitation

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ABSTRACT

Background: Post-concussion syndrome is a challenging condition to manage for even the most experienced chronic pain experts. Patients' presentations are heterogeneous with symptoms spanning physical, cognitive and emotional domains. Regrettably, the symptoms reported have been shown to be non-specific, making it difficult for health professionals to prescribe effective rehabilitation. The aim of the present study was to examine the effectiveness of an individualized rehabilitation program based on subgroup determination following a standardized clinical exam in adults with persistent post-concussion symptoms.
Methods: A total of 16 adult participants (mean age [SD], 38.3 [12.5] years] with persistent post-concussion symptoms participated in a six-week rehabilitation program. Participants were recruited from various external community concussion clinics around the greater Toronto area, Canada. Participants underwent a comprehensive standardized clinical exam to subgroup the ostensible symptom generators. Individualized rehabilitation was then prescribed based on their subgroupings. The primary outcome measure was the Rivermead Post concussion Questionnaire (RPQ). Secondary outcome measures included the Neck Disability Index (NDI), the Patient Health Questionnaire-9 (PHQ-9), and exercise tolerance as assessed via the Buffalo Concussion Treadmill Test (BCTT).
Results: Following six weeks of individualized rehabilitation, participants on average experienced a significant and clinically meaningful change with respect to the RPQ-3 and RPQ-13 (mean change, SD [95%CI] || RPQ-3: 4.6 + 2.4, [3.5-5.6], $p<0.001$; RPQ-13: 13.3 + 8.4, [9.5-16.9], $p<0.001$). Additionally, we observed a significant change in all secondary outcome measures including a reduction in PHQ-9 (mean change, SD [95%CI], 4.4 + 6, [1.7-7], $p<0.01$), NDI (mean change, SD [95%CI], 7.8 + 6.8, [4.7-10.7], $p<0.001$) and exercise tolerance (mean change heart rate threshold, SD [95%CI], 27.8 + 24.1 [10.6-38.4] beats per minute, $p<0.001$).
Conclusion: The standardized exam was feasible and useful in assisting the clinician in prescribing an effective individualized rehabilitation program for adults with persistent post-concussion symptoms. Subgrouping persistent post concussion symptoms based on a standardized exam may be key to successful management in this population.

101 Return to Work Following a Mild Stroke: a Qualitative Study

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ABSTRACT

While stroke incidence is higher in the elderly, cases among adults aged 18 to 64 are rising. These young adults are more likely to experience mild strokes, usually recover faster with fewer motor and sensory impairments, and typically do not receive rehabilitation services. However, they may still experience hidden impairments, including cognitive deficits, psychological symptoms, and fatigue. These impairments often become more disabling when resuming everyday activities, such as work. Given the personal and social importance of work, understanding the challenges faced by young adults in returning to work after stroke is essential. Although a number of studies have looked at the process of return-to-work (RTW) post-stroke, none have examined the issues experienced specifically by this population. The aim of this qualitative study is to describe the RTW experience of young adults who experienced a mild stroke. Specific objectives were to 1) identify factors acting as barriers or facilitators to RTW, and 2) explore the use and needs of professional health services related to RTW. Participants were recruited from a larger study on cognition and participation after mild stroke. In-depth interviews (using a structured guide) were conducted in person or via videoconference with 13 adults who had experienced a mild stroke (77% women; mean age = 48, range = 36-61; mean time post-stroke = 17 months). All had full-time jobs pre-stroke and had attempted a RTW after stroke, including eight who returned progressively and five who returned fully. By the time of the interviews, eight had returned to their previous jobs without changes, two with adaptations, one switched to part-time with a different employer, one took on a new position, and one discontinued work. Interviews were analyzed thematically and factors related to RTW were coded into three categories inspired by the APC model of RTW post-stroke (Schwarz et al., 2018): the person, the workplace, and health services. Preliminary results suggest that person-related factors included stroke sequelae, personal characteristics, motivation, financial and social resources, assessment of readiness for RTW, life context, and coping strategies. Workplace-related factors included the nature of the job, implementation of work adaptations, communication with employers, and disability management. Health service factors included

access to a medical RTW plan and follow-up, communication with medical teams, psychological support, support for physical recovery, and timing of services. Few participants accessed rehabilitation services, with most receiving care from medical teams or family doctors, while many sought private rehabilitation or mental health care. Participants expressed a need for adapted RTW plans (including sick leave, progressive RTW, and ongoing adjustments), readiness assessments, referrals for psychological support, and more information on stroke and RTW. Understanding these needs could improve service delivery, enhancing quality of life, recovery, and social participation for individuals with mild stroke.

102 Is Anyone out There?: A Content Analysis of Facebook Support Group Posts for Individuals with Traumatic Brain Injury

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ABSTRACT

Support groups have long offered critical fora to build community for those in need. In the wake of COVID-19, online support groups on social media sites such as Facebook have become popular platforms to connect, share milestones, seek information, and learn from others. For individuals living with traumatic brain injury (TBI), these online groups offer individuals access to a global community of shared experiences, insight, and expanded networks of support. While the general format and themes of discourse of traditionally moderated in-person support groups have been well-studied, discourse featured on online, public TBI support groups has not been examined. Limited research investigating online behaviors in TBI groups has focused on posts in private, specially moderated groups with no control group. Therefore, little is known about how these groups are utilized when they are accessible to a global audience with little moderation. Therefore, the purpose of this comparison study was to investigate the discourse themes identified in two open access, public TBI support groups on Facebook compared to two control group pages, one arthritis support group and a caregiver support group. A qualitative content analysis was performed on 400 posts wherein each was deductively organized into three overarching categories: Seeking Support, Giving Support, or Other. Each category was expanded into a total of 64 subcategories ranging from socializing, information, emotional, network, esteem, or tangible support, among others, to identify the purpose or goal of the post. Mixed methods were used to assess differences in posting trends between the groups and to compare the number of comments, replies, and exchanges on posts. Minor significant differences were identified between the groups in these areas which was partially consistent with our hypothesis that the TBI groups would show differences in their posting trends compared to the control groups. Results indicated that the TBI groups produced significantly more posts giving support compared to the control groups, specifically in offering access to a network of supporters. Within group analysis revealed that the TBI groups were most focused on asking for advice (52%) and validation for struggles (49%) and offered teaching-related information (52%) and encouragement (56%). These findings suggest that individuals with TBI successfully utilize online support groups to a similar degree as individuals without brain injury. Further expansion of this work is of particular clinical relevance in that isolation and loneliness are significant contributors to depression and suicidal behaviors in this population. Understanding the wealth of online support systems and avenues for information gathering that exist is an important tool for expanding the support services and community for those affected by TBI.

103 Retrospective Validation Study: Comparative Assessment of the RightEye and ImPACT Tests in Evaluating Neurological Function in Adult Concussion Patients

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ABSTRACT

Objective: This preliminary study aims to evaluate the validity of the RightEye test in assessing neurological function in patients with concussion comparing its performance with an established test: the ImPACT test. The primary goal is to determine if the RightEye test can reliably offer results comparable to these established measures.

Study Design: Our retrospective analyses involved a sample of 7 participants, all diagnosed with a concussion within the past year, who completed the RightEye test, and ImPACT test as part of their clinical evaluation. Exclusion criteria included pre-existing neurological or visual impairments and incomplete test data. Data were extracted from medical records, including demographic information and test scores.

Methods: 7 participants (age 19-23) completed the RightEye test, which evaluates eye movements and visual-cognitive functions, and the ImPACT test assesses cognitive function and concussion severity. Data analysis involved calculating descriptive statistics, correlation analysis, and comparative analysis to assess the relationships and differences between the RightEye and Impact tests.

Results: Our results revealed a significant Spearman correlation between the total RE score and Impact visual memory ($r=0.71$; $p<.05$). When analyzing the data using total RE scores threshold (normal>75 vs. abnormal<75), a significant difference in visual memory was also observed ($Z=3.07$; $p<.05$). However, no significant differences were found in total symptoms, verbal memory, visual-motor skills, reaction time, or impulse control.

Conclusion: These preliminary findings indicate that the RightEye test may demonstrate validity in assessing neurological function. Limitations include a small sample size and an

inconsistent timeline of administration of Right Eye testing, which may affect generalizability. Future research with larger samples is recommended to explore further the utility of the RightEye test in clinical and sports settings. Further research is ongoing to clarify the test's effectiveness and utility.

104 Delayed Onset of Paroxysmal Sympathetic Hyperactivity Following Multifocal Stroke: A Rare Case Report

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ABSTRACT

Case Description: A 40-year-old male with acute multifocal stroke status-post tenecteplase and thrombectomy. An otherwise healthy patient presented with a basilar artery occlusion and was treated with tenecteplase followed by thrombectomy. The procedure was complicated by showering multifocal infarcts. Initially, the patient progressed well during acute rehabilitation. However, approximately six weeks post-thrombectomy, he developed fevers, diaphoresis, tachycardia, posturing, and elevated blood pressure. An infectious workup, EEG, and brain MRI were negative. Due to these events, he regressed in therapy progress and was transferred to our acute rehabilitation facility. Upon admission, the patient scored 17 on the Paroxysmal Sympathetic Hyperactivity (PSH) Assessment Measure, confirming the diagnosis of PSH.

Assessment/Results: Given the patient's polypharmacy, initial management focused on weaning off medications that could exacerbate symptoms. Propranolol was started for prevention, and clonidine was used for abortive therapy. Propranolol was later uptitrated, and clonazepam was added to further control symptoms. Optimizing the sleep-wake cycle was also prioritized. After six weeks, the patient's PSH score improved to 3, leading to increased wakefulness and participation in therapy. This allowed for significant and consistent progress toward rehabilitation goals by discharge.

Discussion: This case highlights the rare occurrence of late-onset PSH in a non-traumatic brain injury patient. While literature reports the median onset of PSH after stroke is around five days, this case demonstrates a delayed presentation. The PSH Assessment Measure can be a valuable tool for diagnosing autonomic dysfunction in brain injury cases with varied etiologies.

Conclusion: PSH should be considered and assessed in patients exhibiting autonomic dysfunction following severe brain injury, regardless of timing.

106 Adaptation of the Scales of Cognitive and Communication Ability for Neurorehabilitation for the Ghanaian Context

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ABSTRACT

Acquired brain injury (ABI), including stroke and traumatic brain injury, is an emerging public health challenge in Ghana, leading to significant death and disability, including cognitive-communication disorders (Adjorlolo, 2018; Donkor, 2018). These disorders impact daily activities such as work, school, and social interactions (Marshall et al., 2018). To enhance social functioning, communication, behavior, return to school/work, and overall quality of life for individuals affected by ABI, setting appropriate rehabilitation goals based on accurate cognitive-communication assessments is crucial (Santos et al., 2019). However, a major challenge in Ghana's ABI rehabilitation sector is the absence of standardized assessment tools that are culturally and linguistically appropriate (Kankam & Murray, 2023; Tsiwah et al., 2021). This study aims to develop a culturally and linguistically appropriate assessment tool for acquired cognitive-communication disorders in Ghana. Specifically, it seeks to adapt the existing Western-standardized cognitive-communication assessment tool, the Scales of Cognitive and Communication Ability for Neurorehabilitation (SCCAN; Milman & Holland, 2012), for the Ghanaian context in both the country´s formal language, English (Adika, 2012), and a widely spoken local dialect, Twi (Tsiwah et al., 2021). The study will also evaluate the validity and reliability of the adapted SCCAN versions. Our presentation will focus on summarizing the current speech-language therapy context in Ghana (including services for ABI), describing our process for test adaptation and translation, and sharing preliminary results from Ghanaian adults with and without ABI.

107 health Disparities In Rehabilitation Patients with Brain Injury Who are Homeless or Marginally Housed.

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ABSTRACT

Homelessness has profound and multifaceted impacts on health, creating a cycle of poor health outcomes and barriers to effective medical care. The interplay between homelessness and health is complex, influenced by economic, social, and environmental factors. Poor health and homelessness are cyclical and mutually reinforcing, where each condition exacerbates the other. Homelessness increases the risk of poor health, while poor health can be a direct cause or consequence of homelessness.

There appears to be a bidirectional link between traumatic brain injury (TBI) and unstable housing. This complex interaction creates a cycle of vulnerability, where TBI increases the risk of homelessness, and unstable housing can increase the risk of sustaining a TBI. TBI is disproportionately high among individuals who are houseless (HL) or marginally housed (MH), which is due to a variety of factors: increased exposure to violence, accidents due to unstable living environments, malnutrition, high rates of substance abuse, and comorbid psychiatric factors. Furthermore, once homeless, they are at higher risk of further TBIS, which worsens their cognitive and physical functioning and makes it more difficult to escape homelessness.

Medical rehabilitation is a crucial step in promoting recovery and improving the quality of life for individuals who have suffered organic injury to the brain. However, little is known if medical disparities are present in rehabilitation. Therefore, an exploratory analysis was conducted to examine the demographic data of a sample of patients who are HL or MH with TBI and receiving inpatient rehabilitation at Rancho Los Amigos National Rehabilitation Center. Psychosocial comorbidities and rehabilitation outcomes were explored.

The sample included 49 inpatients from CBIP over 5 years (2018-2023) identified through medical records as HL or MH, with demographic and inpatient rehabilitation outcomes extracted from records. The sample was racially/ethnically diverse (27% Black/African American (AA), 40% Hispanic/Latino, 25% White, 6% Asian/Pacific Islander, and 2% Other). 80% of the Hispanic/Latino sample were monolingual Spanish-speakers. 71% of the sample was middle-aged (40-69 years), and 55% had less than a high school education. A higher proportion of Black/AA patients were HL or MH compared to stable housing. Auto vs. pedestrian was the most common mechanism of injury. 51% of the HL/MH sample did not have capacity at discharge and were discharged to a skilled nursing facility or returned to HL/MH housing. Regarding disparities in rehabilitation stay, t-tests revealed significantly longer rehabilitation stay with transitional care among Black/AA patients than White patients ($t = -2.19$, $df = 14.89$, p-value = 0.04), 48.23 days compared to 23 days. This may reflect disparities in hospitalization and care, injury severity, and/or other comorbid conditions that influence recovery outcomes. No differences in length of stay differed between English and Spanish-speaking patients.

108 Resilience on the Court: Return to Competitive Basketball After Moderate to Severe Traumatic Brain Injury

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ABSTRACT

Case Diagnosis: A 17-year-old male involved in a motor vehicle collision (MVC) sustained a moderate to severe traumatic brain injury (TBI) and successfully returned to competitive basketball six months post-injury.

Case Description: A 17-year-old male presented to a Level 1 trauma center following an MVC, with an initial Glasgow Coma Scale (GCS) score of 12. Head imaging revealed a grade 2 diffuse axonal injury and a left frontal hemorrhagic contusion. His hospital course was complicated by severe agitation, which gradually resolved. The patient was eventually discharged home.

Two months after discharge, he visited the outpatient TBI clinic, seeking clearance to return to competitive basketball. At that time, he had achieved a full recovery to his pre-injury physical and neurological baseline. He had resumed school with high academic performance, regained his ability to drive, and returned to non-contact sports. A follow-up CT scan six months post-injury showed no residual hemorrhage, and a comprehensive neurological exam was normal. Based on these findings—his full return to premorbid baseline, successful reintegration into daily life, and normal neuroimaging—the patient was cleared to resume competitive basketball. He was counseled extensively on the potential risks and benefits of returning to sport post-TBI.

Discussion: Emerging data and clinical experiences reveal that young patients with moderate to severe TBI can make remarkable recoveries, challenging previous assumptions about long-term impairment. However, there are currently no specific guidelines for returning to competitive sports following moderate to severe TBI. This case offers insight into the decision-making process clinicians may use when evaluating patients for a return to high-level physical activity after such injuries.

While this patient demonstrated full neurological and cognitive recovery, further research is needed to define the criteria for assessing readiness to resume competitive sports. Factors such as injury severity, cognitive and neurological recovery, time elapsed since injury, and repeat neuroimaging results may all play crucial roles in this decision-making process. Additionally, the benefits of promoting physical activity and social reintegration must be weighed against the potential risks of re-injury.

Conclusions: No standardized guidelines currently exist for determining when it is safe for patients with moderate to severe TBI to return to competitive sports. As full physical and

neurological recoveries become more common in young TBI patients, individualized assessments—including cognitive status, neuroimaging, and recovery milestones—should guide decision-making. Developing clear guidelines for return to sport will be essential in the future to ensure optimal outcomes for TBI patients.

109 Developing a Framework and Recommendations to Improve Brain Injury Supports and Services in the Province of Manitoba Using a Community-Engaged Qualitative Approach

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ABSTRACT

Introduction: Bill C-277 is a current campaign for the Canadian government to enact a national strategy on brain injury. In turn, this will require Canadian provinces to implement provincially sensitive plans to meet the needs of people affected by brain injury. Manitoba, a prairie province with a diverse population of 1.48 million people spread across a vast geography, presently lacks a provincial strategy, resulting in many brain injury supports and services being under-resourced or unavailable.

Objective: Our aim was to develop a unified understanding, focus, and recommendations for provincially sensitive action, advocacy, and improvement in brain injury supports and services.

Methods: Our research team, including people with lived, work, or research-related experience, used community-engaged methods to complete phase 1 of the Brain Injury in Manitoba (BIMb) project in 2023-2024. Phase 1 included facilitating a World Café as a qualitative data collection and networking method with a focus on the Winnipeg region, which is the largest urban centre and 60% of the provincial population. The World Café included 10 people who live with brain injury, 2 caregivers, and 23 people with work-related brain injury experience. Using a content analysis approach, including counting of ideas, we generated idea categories and sub-categories using qualitative summary notes and written responses collected at the World Café. We then used the categories to develop a framework and recommendations. Last, we held four anonymous online town-hall feedback sessions for people with lived or work-related brain injury experience, where summary notes further developed our framework and recommendations.

Results: We developed the "Hour-glass Framework for a Manitoba Brain Injury Strategy," which represents a dynamic relationship between four inter-connected categories: (1) shared philosophy of brain injury care; (2) macro-level decision-making and administration; (3) micro and meso-level practice for supports and services; and (4) brain injury awareness through advocacy and activism. At the World Café, the most discussed idea subcategories within the hour-glass framework included focusing on thriving and living in one's community (philosophy; n= 31 discussion idea counts); treating brain injury as a chronic condition (philosophy; n= 14), increased funding for supports and services (macro decision-making; n= 39), improving system integration (macro decision-making; n= 39), creating enough and timely supports and services (micro-/meso-level practice; n= 40), enhanced case management supports (micro-/meso-level practice; n= 35), varied supportive housing options (micro-/meso-level practice; n= 20), increased general awareness and education (advocacy/activism; n= 33), and including the voice of lived experience (advocacy/activism; n= 20).

Conclusions: Our framework and recommendations implore the collaborative involvement of the government, health authorities and systems, and people with lived, work, and research-related experience. The results from phase 1 of the BIMb project are already being used within Manitoba to advocate for change and could be meaningful to other areas.

110 Adults Living With Brain Injury Report Positive Outcomes After Using A Financial Wallet-Card To Address Financial Capability In A Pilot Longitudinal Qualitative Intervention Study

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ABSTRACT

Introduction: Brain injury can negatively influence a person's capability to manage personal finances, with 30% to 70% of people self-reporting issues managing their finances after acquired brain injury (ABI). Yet, there is only one published intervention study addressing financial capability after ABI and no study about lower-cost financial capability products for adults living with ABI.

Objective: Our aims were to: (1) co-design an individualized low-cost financial wallet-card product and (2) explore the card's acceptability, feasibility of use, outcomes of actual use, and ideas for improvements.

Methods: We conducted a pilot longitudinal qualitative intervention study. We included 10 adult participants living with

ABI (n=7 female; age range: 28-74 years; ABI mechanism: n=7 traumatic, n=2 stroke, n=1 other; time since ABI range: 1-59 years). We co-designed a two-sided financial wallet-card with each participant; side one provided social-cues to guide others in providing individualized support in financial-related situations, and side two included personal financial management reminders. Participants could update their card during the study. We provided participants physical and electronic card versions and completed up to six individual interviews with each participant over 2-3 months. We analyzed interview transcripts using content analysis.
Results: Co-designed card content varied depending on participants' needs and contexts. Five participants updated their cards during the study. Nine participants expressed general support and acceptance of the card at the start of the study and eight at the end of the study. Reasons for card acceptability included empowerment in the co-design process (n=8 participants) and feeling the card fit well into their daily life (n=8). Negative feelings for acceptability were not liking an element of the design (n=6) and personal worries about potential negative reactions of others (n=4). These continued worries were noted as a barrier to using the social-cues side of the card at different times and in some contexts (n=9). All participants noted self-efficacy or cognitive challenges with initiation or memory as barriers to card feasibility of use. Participants identified multiple feasibility of use facilitators, including card convenience, flexibility, versatility, and accessibility (n=9). Eight reported positive use outcomes during the study. Positive outcomes reported included personal feelings of empowerment and validation (n=9), providing information to others in a way that positively changed others' behaviours (n=8), and changing their own financial thoughts and behaviours (n=9). Seven participants planned to continue to use the card after the study. Card improvements identified included changes to card materials (n=2), better publicly known organizational affiliations (n=3), and improvements to electronic card access (n=3).
Conclusions: Our results provide initial effectiveness evidence for a co-designed financial wallet-card, which could be a cost-effective and scalable intervention product. Enhancing card materials quality and partnering with a more publicly known organization could improve perceived card legitimacy and use.

111 Sex Differences in Response to Low Versus High Volume Targeted Heart Rate Aerobic Exercise for Sport-Related Concussion, a Pilot Randomized Controlled Trial

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ABSTRACT

Objectives: Individualized sub-symptom threshold aerobic exercise facilitates recovery from sport-related concussion (SRC) and reduces the incidence of persisting symptoms. No definitive volume or dosage of exercise is known to maximize outcomes or improve adherence. It is also unknown if current recommendations for post-concussive aerobic exercise are equally efficacious in males and females. This study assessed low- versus high-volume aerobic exercise prescriptions for their efficacy in facilitating recovery from SRC in males and females. Additionally, this study evaluated exercise adherence between sexes and groups. Methods: Athletes 6.18 ± 2.21 days of SRC (n= 32, 66% male, 15.6 ± 1.4 yrs) and healthy controls (n= 28, 66% male, 16.0 ± 1.6 yrs) performed a graded treadmill test weekly (Days 0, 7 and 14). Concussed and control participants were then randomly prescribed individualized aerobic exercise at high (5 days/week for 30 minutes) or low volumes (3 days/week for 20 minutes); intensity was based upon 90% of the achieved heart rate on the treadmill test. At-home exercise data were recorded with a Polar heart rate monitor (H10), and exercise sessions were observed through video calls to ensure safety and to confirm Polar exercise log reports. Results: Minimal differences in recovery time were seen on survival analysis among males. Although it did not reach statistical significance ($p = 0.058$), females in the low-volume group appeared to recover faster during the first four weeks after injury than in the high-volume group. Of the 24 exercise-intolerant participants, 8 were female (73%), and 18 were male (86%). Of the 8 females, 7 (88%) had to stop their at-home exercise sessions early on one or more days due to a more than mild symptom exacerbation increase of VAS by ≥2 points vs. baseline). Conversely, only 3 (17%) of males had to stop an exercise session early on one or more days due to symptom exacerbation ($p = 0.002$). Furthermore, adherence rates were relatively similar between all groups except that concussed women adhered to high-volume prescriptions less often than control women (17%, 80%). Conclusion: Concussed females prescribed a high volume of exercise took longer to recover than concussed females prescribed a lower volume, which was not seen in males. Symptom exacerbation during at-home exercise may have affected female exercise behavior. Although aerobic exercise benefits SRC recovery, this study highlights the need for future research to optimize exercise treatment prescriptions for females with SRC.

112 Cardiopulmonary Responses During Exercise Testing in Adolescents after Sport-Related Concussion

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ABSTRACT

Objective: Symptom-limited exercise intolerance is a physiological sign of sport-related concussion (SRC) that may be caused by limited oxygen consumption in exercising muscle or by aerobic deconditioning. The autonomic nervous system (ANS) modulates cerebral and systemic hemodynamic responses to aerobic exercise. During concussive injury, rotational forces may be applied to the upper cervical spine, potentially damaging functional ANS centers within the brainstem, leading to an uncoupling of the connections between the

central ANS, the arterial baroreceptors, and the heart. Hence, this study examined cardiopulmonary function during cycle ergometer exercise in concussed adolescent athletes within 10 days of SRC.
Methods: Concussed participants (n = 26, 15.4±1.1 years, 54% male, mean 7.3±1.8 days from injury) and healthy controls (n = 24, 15.8±1.6 years, 58% male) completed the Buffalo Concussion Bike Test (BCBT). Blood pressure (BP), heart rate (HR), stroke volume (SV), cardiac output (CO), respiratory rate (RR), minute ventilation (MV), oxygen consumption (VO2), and end-tidal CO2 (EtCO2) were collected at rest and continuously during exercise. Participant demographics and resting physiological parameters were compared at baseline using independent samples t-tests and $\chi 2$ tests. Mixed model linear regressions were used to compare groups within the first five stages of the BCBT.
Results: Concussed and control participants did not differ in demographics except that concussed participants reported a higher number of previous concussions ($p< 0.001$). Concussed participants exercised for 16.24±5.6 minutes, had symptom exacerbation by the tenth minute and reported higher perceived exertion throughout exercise versus controls. Controls exercised for 25.08±7.0 minutes without symptom exacerbation. There were no differences in resting cardiopulmonary measures between groups. Concussed participants had higher MV during exercise, and their BP plateaued at lower values.
Conclusion: Our data did not find evidence of aerobic deconditioning in patients with SRC. Our results suggest that attenuated autonomic control of cardiac function is the primary cause of exercise intolerance in adolescent athletes after SRC. These results should be considered in future research on concussion physiology and therapeutic approaches to improve outcomes.

113 Effects of Physical Exertion on Sideline Concussion Assessments After Team Practice or High Intensity Exercise in Adolescent Athletes

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ABSTRACT

Objective: The Vestibular Ocular Motor Screen (VOMS) and the Sport Concussion Assessment Tool 6 (SCAT6) are commonly used point-of-care concussion assessments that typically are administered immediately or soon after sport participation/exercise. Point-of-care concussion assessments ideally should not be affected by physical exertion to remain valid. This study assessed the effects of practice participation or high-intensity exercise on the mVOMS (modified VOMS) and SCAT6 in non-concussed high school athletes.
Methods: Adolescent athletes (n=23, 39% male, 15.5 ± 1.0 years) completed the SCAT6 and the mVOMS before exercise, immediately after exercise, and after a 20-minute rest. Exercise was a standard sport practice. Rating of Perceived Exertion (RPE) and heart rate (HR) were measured at each time point to confirm the exercise intensity. The post-practice assessment was conducted only if the RPE was ≥ 17 or HR was ≥ 80% of the age-predicted maximum. Participants who did not meet these criteria completed a high-intensity 300-meter shuttle run before the second assessment.
Results: Timed Tandem Gait (TTG) ($p=0.005$) and Dual Task Tandem Gait (DTTG) ($p=0.045$) improved significantly from pre- to immediately post-exercise as well as from pre- to 20-minutes post-exercise (TTG [$p=0.002$] and DTTG [$p=0.006$]). There were no other differences in SCAT6 or mVOMS scores among the three time points.
Conclusions: SCAT6 and mVOMS performance was not adversely affected by high levels of physical exertion. TTG and DTTG performance improved after exercise, likely due to the learning effect. Further research should be conducted on other populations to increase the generalizability of our findings. Clinicians can be confident that physical exertion does not negatively impact performance in these widely used sideline concussion assessment tests in non-concussed adolescent athletes.

114 Association Between Salivary Brain-Derived Neurotrophic Factor and Exercise Volume in Concussed Adolescent Athletes

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ABSTRACT

Objective: Current guidelines for sport-related concussion (SRC) management rely on self-reported symptoms and clinical examinations, which can be subjective and occasionally prone to error. Brain-Derived Neurotrophic Factor (BDNF), a neurotrophin that promotes neuronal healing, may be informative for SRC management. Aerobic exercise is recommended for SRC recovery, and BDNF expression increases with the volume of aerobic exercise. This pilot study measured salivary BDNF in adolescent athletes prescribed aerobic exercise throughout a two-week intervention.
Methods: Athletes with SRC (n=32, 15.6 ± 1.4 y/o, 66% male, 6.2 ± 2.2 days from injury) and controls (n=28, 16.0 ± 1.6 y/o, 68% male) provided saliva samples and completed standard clinical exams at initial visit, 7 and 14 days later. Participants were randomly assigned to either high (5 days/week, 30 min) or low (3 days/week, 20 min) volumes of aerobic exercise. An optimized methodology was used to process saliva samples, and BDNF levels were measured in triplicates using an Enzyme-Linked Immunosorbent Assay (ELISA, R&D System).

Results: Concussed females had higher initial salivary BDNF than controls (67.3 pg/mL vs. 42.4 pg/mL, p=0.002), which persisted throughout the intervention. Males showed no differences. The change in BDNF between the initial and final visits was not associated with exercise volume. Salivary BDNF expression in concussed adolescents was not associated with relevant clinical findings. There was a near significant association after Bonferroni correction (p=0.025) of change in BDNF and time to first visit in females (p=0.037). Concussed females presented later to the initial encounter than males (7.7 ± 4.2 vs. 4.9 ± 2.6 days, p=0.044).
Conclusion: Our data show that sex plays a significant role in salivary BDNF expression. This should inform future research on the physiology of concussion. Our data also suggest that the female BDNF expression may depend on the time since injury. Future studies should attempt to collect salivary BDNF closer to the point of injury. Our data did not show a relation of exercise volume to BDNF, likely due to the brief length of the intervention. Our novel analytical methods helped to ensure reliable BDNF measurement and should be emulated in future studies. Further investigation of the association between sex, recovery time, exercise, and BDNF modulation with a larger sample size is warranted and could have practical implications for clinicians treating concussed adolescents.

115 Participants Report Meaningful Outcomes And Goal Attainment After An Individualized Financial Coaching Program For Adults Living With Brain Injury: A Pilot Mixed-Methods Intervention Study

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ABSTRACT

Introduction: Between 30 to 70% of people living with acquired brain injury (ABI) experience challenges with managing finances, which can affect financial and general wellbeing. Yet, there is a dearth of evidence for financial empowerment programs for adults living with ABI. A recent focus-group study identified ABI-sensitive financial coaching (FC) as a critical intervention wanted by people living with ABI. However, there is only one published study, from 2012, related to FC for adults living with ABI.
Objective: To examine participation and outcomes for adults living with ABI in an ABI-sensitive, goal-oriented, and metacognitive strategy-based FC program.
Methods: This mixed-methods and pre-post intervention pilot study analyzed quantitative and qualitative data about a novel FC program and included adults (age 18+) living with ABI. Participants could include a close-other support person. This program included up to 10 sessions and was developed using modified Cognitive Orientation to Occupational Performance (CO-OP) and trauma-informed approaches. Participants addressed two financial-related goals during sessions that were led by occupational therapists trained in the CO-OP approach and financial empowerment facilitation. Modified versions of the Canadian Occupational Performance Measure (COPM) and Goal Attainment Scaling (GAS) provided quantitative goal-attainment data. Post-program individual interview data was collected from all participants and close-others. Interviews explored program usefulness, meaningfulness, strengths, and possible program improvements. Interview data was analyzed using a content analysis approach.
Results: The five participants included three men and two women (age in years range: 37-72; years post-ABI range: 3-18). Two participants had close-others involved (one spouse; one common-law partner). Four of the five participants completed their FC sessions; one ended participation after four FC sessions but provided post-program data. Seven of the eight total goals (87.5%) across the four participants who completed the FC sessions were achieved in the program. Three participants scored their goal attainment after the program on the modified GAS as the highest possible score (i.e., +2, goal met much better than expected) on at least one of their goals. For pre-post change scores on the modified COPM, three participants had an average performance change score of 2.5 or higher, and four participants had a positive goal satisfaction score change, ranging from +1 to +8. Qualitative data demonstrated that the four participants who completed the program felt the program was useful, meaningful, and feasible. They felt empowered and adequately supported to meet their goals and they liked the structure of the program. However, they thought sessions should have been more spread out.
Conclusions: The results demonstrate initial support that an individualized FC program is well-equipped to support adults living with ABI to meet their financial-related goals. Future research should explore FC findings in larger samples and explore program cost-analysis and future tele-intervention approaches.

117 A Service Evaluation - The Power of Partnership for Better Outcomes After Brain Injury and Stroke

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ABSTRACT

Five years into a partnership between CONNECT Communities and Hamilton Health Sciences, a 2024 Service Evaluation has revealed compelling outcomes on both a human and a health system level.
Hamilton Health Sciences, the legacy Hamilton Niagara Haldimand Brant LHIN, and a collection of acquired brain

injury service providers collaborated on the identification of a gap in the service continuum in Ontario and produced an RFP to solicit proponents to fill that gap.
CONNECT was awarded that contract, and, in partnership with Hamilton Health Sciences, opened its doors in 2019.
As part of the planning of this service, the legacy LHIN asked HHS and CONNECT to evaluate the service after four years. The teams put their heads together to create a scorecard to gather data on a human and system level. A service evaluation was produced to see if the gap that had been identified was being filled.
The Service Evaluation revealed:
1. Outstanding personal outcomes for individuals after brain injury and stroke moving back to community;
2. Significant system improvement contribution in the Ontario Health West Region;
3. Value for money demonstrated by a powerful Return on Investment (ROI), break-even point and long-term health system savings; and
4. Extensive contribution and alignment with the Ontario Ministry of Health and Ontario Health's Strategic Priorities 2023/'24.
CONNECT was founded in British Columbia in 1993 to create a better pathway for people after brain injury and stroke. CONNECT's Life Redesign Model is intentionally different and focuses on participation in real life and meaningful activities in a supported home environment. People move to CONNECT where they build their life with the right supports and approach. CONNECT's Life Redesign Model is deemed Leading Practice by Accreditation Canada and is characterized by the following:
• A culture of personal accountability, supported risk taking, social capital and meaningful community participation;
• Services planned around what the person wants in life, where participation in relevant life situations drives the individual's goals;
• Service plans leverage neuroplasticity by pursuing goals and rewiring in real-life, non-institutional settings; and
• A "doing-with" coaching approach with blended job roles and a multi-professional coaching team.
The outcomes in Hamilton tell a story that could change the trajectory for individuals and health regions across the country, including a move-home-rate of 70%.
Patti Flaherty, CEO of CONNECT and Kim Young, Director, Regional Rehabilitation and Integrated Stroke at HHS will present these and other compelling findings from the Service Evaluation.

119 Symptom and Quality of Life Trajectories Over the First Four Years Following Hospitalization After Mild Traumatic Brain Injury

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ABSTRACT

Background: The evolution of symptoms and quality of life (QoL) after mild traumatic brain injury (mTBI) varies between individuals. Group-based trajectory modeling (GBTM) approaches have previously highlighted this heterogeneity during the first year post-mTBI but do not appear to have been employed over a longer duration in this population.
Objectives: 1) Identify symptom and QoL trajectories over the first four years following mTBI; 2) examine patterns of symptom trajectory membership in relation to QoL trajectory membership; 3) assess relationships between sociodemographic and injury-related variables and QoL trajectory membership.
Methods: Participants were 143 adults (ages 18-65) who had sustained a mTBI and had been hospitalized for at least 24 hours after injury (not necessarily due to the mTBI). They were assessed at 4, 8, 12, 24, 36, and 48 months post-mTBI using validated questionnaires and an interview to evaluate anxiety, depression, fatigue, insomnia, subjective cognitive symptoms, headaches, and dizziness, as well as QoL. GBTM analyses were conducted to detect trajectories, while chi-square tests were performed to assess relationships between symptom and QoL trajectory membership. ANOVAs and chi-square tests assessed relationships between participant characteristics and QoL trajectory membership.
Results: The identified trajectories demonstrated a high degree of stability over time. Notable percentages of participants had clinically significant symptoms for the entirety of the study: 62% for subjective cognitive symptoms, 54% for fatigue, 44% for anxiety, 43% for insomnia, 27% for depression, 23% for headaches, and 17% for dizziness, while 66% had low QoL. Membership in a trajectory of greater symptom severity, no matter the symptom, was significantly associated with membership in a trajectory of poorer QoL. None of the sociodemographic or injury-related variables examined (i.e., sex, age, intracranial injuries, history of previous mTBI, psychiatric history, years of education, or length of inpatient hospitalization) were associated with QoL trajectory membership.
Conclusions: Clinically significant symptoms are common and persist for up to four years in a substantial minority of individuals hospitalized after mTBI. While the factors influencing

symptom persistence and QoL require further investigation, the relationship between symptom and QoL trajectories suggests a need to treat symptoms in order to improve QoL.

122 The Perils of Mindfulness for Brain Injury Care

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ABSTRACT

Since the Concussion Clinic at GF Strong Rehab Centre in Vancouver strongly recommended that I take up mindfulness after sustaining a brain injury in a car accident in 2013, the original working hypothesis of this decade-long research project was that mindfulness would be beneficial for brain injury. As corroborated by the growing body of research in this field, many aspects of mindfulness did indeed help reduce the frequency, intensity, and duration of my nervous system dysregulation as well as other symptoms. Since mindfulness was prescribed without a warning label, I was surprised to also discover that many mindfulness practices were actually deeply dysregulating. By combining knowledge of the ways in which brain injury survivors are easily dysregulated, with the fact that many mindfulness practices require intimate interoceptive attention to our bodies, I began to understand the logic behind the body's tendency to trigger fight, flight, or freeze responses in reaction to certain mindfulness practices. Research for this qualitative study involved integrating insights from brain injury and mindfulness literature with extensive formal and informal mindfulness training via retreats, courses, and daily mindfulness practice. Initially, I closely tracked the impact of various mindfulness practices on my own nervous system, tacking towards nervous-system regulating practices and away from dysregulating ones. These initial findings were further tested by observing how my mindfulness students responded to modified mindfulness teachings which focus first on regulating the nervous system. The preliminary findings suggest that when first learning mindfulness for brain injury: 1. It is important to give options since everybody and every body is different. 2. It is important to begin with anchors of attention that are least likely to be dysregulating, such as mindfulness in nature, mindful self-compassion, yin and restorative yoga, long slow deep breathing, and joy and gratitude practices. 3. It is important to avoid mindfulness practices which may be more likely to be dysregulating, such as the deep interoceptive awareness of body scans, open awareness meditation, and noting practices, all of which may also be overly cognitive and may incur a detrimental switch cost. 4. It is important to avoid practices that are lengthy, involve multitasking, or that ask students to become comfortable with the uncomfortable sensations of their symptoms before they have some capacity for self-regulation. A logical next step would be to investigate these initial findings further with a large study that compares the efficacy of the Mindfulness-Based Stress Reduction program to the Mindful Concussion course that integrates modifications specifically tailored for brain injury. These findings may encourage brain injury specialists to prescribe mindfulness, but with a much-needed warning label, so that survivors may benefit from the power of mindfulness for brain injury, without falling prey to potential perils.

123 Virtual Reality Assessment of Prospective Memory and Executive Functioning in Adults with Moderate-Severe Traumatic Brain Injury

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ABSTRACT

Background: Moderate-severe traumatic brain injury (TBI) can result in persistent cognitive difficulties, particularly affecting executive functions and prospective memory, which impact daily functioning. While traditional paper-and-pencil or computerized neuropsychological tests are generally used, their ecological validity is limited. Virtual reality offers a promising alternative, reducing cost of in-home assessments and enhancing standardization. However, data on the use of ecological virtual reality tests in the TBI population is scarce.

Objectives: The general aim of this study was to examine the validity of the Virtual Multitasking Test (VMT), a multitasking scenario performed in a non-immersive virtual apartment, for evaluating prospective memory and executive functions in adults with moderate-severe TBI and control participants. The specific objectives were to explore associations between performance on the VMT, traditional neuropsychological measures, and measures of user experience (cognitive load, cybersickness, sense of presence), and to examine the discriminant validity of the VMT (i.e., TBI vs control group).

Methods: Fifteen participants with moderate-severe TBI (20% female; mean of 43.5 years; mean of 80 months post-TBI) and fifteen age-, sex- and education-matched control participants were recruited. The experimental visit was divided into two parts: neuropsychological testing (Tower of London, Zoo Map Test, CAMPROMPT, and subjective questionnaires) and virtual reality testing with the VMT. The VMT, averaging 25 min, involves completing tasks that are known in advance (putting away groceries, preparing a recipe, setting the table) and unplanned tasks (e.g., putting a shirt in the dryer), soliciting prospective memory, multitasking, flexibility, and planning abilities.

Results: Significant moderate to large correlations were found between traditional neuropsychological measures (Tower of London, CAMPROMPT) and performance on the VMT (total score, prospective memory score). Better performance on the VMT was also significantly associated with higher perceived cognitive load, but showed not association with self-reported memory and executive functioning, cybersickness, or sense of presence. Regarding the second objective, the VMT

total score showed a sensitivity of 80% and a specificity of 73% for identifying participants with moderate-severe TBI. Significant between-group differences were observed on the total score and the prospective memory score of the VMT, with the TBI group showing poorer performance.
Conclusions: The VMT appears to be a valid ecological tool to evaluate cognitive functioning in an adult population with TBI. Diversifying methods to assess executive functioning and prospective memory, including tasks with high ecological validity, may better identify day-to-day challenges in individuals with brain injury.

124 Diagnosis of mTBI in an ER-Setting Using Eye-Tracking and Virtual Reality Technology: An Exploratory Study

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ABSTRACT

Objective: The aim of the study was the systematic exploration of point-of-care biomarkers as diagnostic indicators for the detection and exclusion of mild traumatic brain injury (mTBI) in an Emergency Setting using Eye-Tracking and Virtual Reality (ET/VR) technology. The primary target group included patients who had suffered an acute trauma to the head and presented within 24 hours to the emergency department. The aim was to investigate oculomotor biomarkers for their suitability in diagnosing mTBI in a consecutive cohort of patients exposed to external force and to test the practicality of using ET/VR goggles in an emergency department.
Methods: The BG Unfallkrankenhaus Berlin and the BG Klinikum Hamburg participated in this explorative prospective single-arm accuracy study. In the emergency department, patients with suspected mTBI were included and examined using ET/VR goggles. All further steps followed clinical routine (e.g., decision on hospital admission, imaging diagnostics). The clinical diagnosis of mTBI was made after treatment completion and blinded to the results of the index test (examination using ET/VR goggles) through a clinical synopsis by two independent clinical experts. The diagnosis was based on all clinical, neurological, neurofunctional, neuropsychological, and imaging findings. Routine trauma and neurological history, examination, and findings were recorded for each case. All statistical analyses were conducted with exploratory intent.
Results: The use of ET/VR goggles was found to be predominantly unproblematic. Two of the 52 analyzed parameters were statistically distinguishable from random decision-making. No differences in oculomotor function were found between the two subgroups.
Conclusions: No correlations were found between the parameters recorded with the VR goggles and the detection of mTBI. Currently, the use of VR goggles for diagnosing mTBI in an ER setting cannot be recommended.

125 The Prevalence and Functional Outcome of Children with Stroke

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ABSTRACT

Background: Childhood stroke is defined as stroke occurrence after 28 days to 18 years of age. The aim of this study is to investigate the epidemiology of childhood stroke in children in Hong Kong from 2006 to 2020, as well as to examine the risk factors that are related to poorer functional outcomes.
Methods: We conducted a population-based retrospective cohort study on childhood stroke by analyzing clinical data from the 2006 to 2020 birth cohorts in Hong Kong. We identified cases of childhood stroke using the following ICD-9 codes: 430 (Subarachnoid hemorrhage), 431 (Intracerebral hemorrhage), 433 (Occlusion and stenosis of precerebral arteries), 434 (Occlusion of cerebral arteries), 435 (Transient cerebral ischemia), and 437 (Other and ill-defined cerebrovascular disease). Using ICD-9 codes to indicate related disorders and impairments, we identified stroke outcomes in motor, cognitive, neuropsychiatric, and speech/language aspects among the selected stroke cases. We also utilized allied health service utility data, including physiotherapy, occupational therapy, speech therapy, and clinical psychology, to assess and identify the outcomes. A Cox proportional hazard regression model was used to estimate the hazard ratio (HR) between age of stroke onset and post-stroke adverse outcomes.
Results: From 2006 to 2020, there were 49 (33.1%) cases of arterial ischemic stroke, and 98 (66.2%) cases of hemorrhagic stroke. Among the children with stroke, 105 children presented with motor deficits, 18 children presented with cognitive deficits, 57 children presented with neuropsychiatric deficits, and 67 children presented with speech/language deficits. Cox regression analyses revealed that age of stroke was significantly associated with an increased risk for adverse motor (adjusted HR, 1.69 [95% CI 1.04,2.75]) and neuropsychiatric (2.96 [1.39,6.32]).
Conclusions: Over half of the children with stroke suffer from motor deficits. In addition, a high proportion of children with stroke also suffer from speech/ language, neuropsychiatric, and cognitive deficits. Our findings demonstrate a significant correlation between the age of stroke diagnosis and the probability of experiencing unfavorable functional outcomes. Additional research is required to gain a more comprehensive understanding of the functional abilities of children with stroke. This knowledge is necessary to create effective interventions and rehabilitation approaches that can improve their quality of life and long-term outcomes.

126 Sex Differences in Response to Early Aerobic Exercise Prescriptions in Athletes with Sport-Related Concussion: A Reanalysis of Two Randomized Controlled Trials and Systematic Review

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ABSTRACT

Introduction: A prescription of targeted heart rate aerobic exercise (THRAE) in athletes with acute sport-related concussion (SRC) facilitates recovery and reduces the incidence of delayed recovery (Persisting Post-Concussive Symptoms) in randomized controlled trials (RCT). Studies have attempted to control for sex by ensuring equal distribution of males and females. These studies showed there are no differences in recovery time between the sexes, however no studies have examined the effect of THRAE in males and females separately.

Methods: We conducted a systematic review of studies of THRAE in both male and female athletes within 2 weeks of SRC that had a control group. Searches were run in September 2023 in five databases: CINAHL Plus with Full Text (EBSCO), Embase (Elsevier), PubMed, SPORTDiscus with Full Text (EBSCO), and Web of Science Core Collection. Studies were deduplicated and added to Covidence where they were reviewed by 2 independent reviewers to see if they controlled for participant sex. No risk of bias for included studies was performed. We authored two of the included studies, so we were able to reanalyze the data using survival analysis after stratifying by participant sex.

Results: We identified 1031 studies, out of which 7 were relevant. No study examined the effect of intervention by sex. One study showed no differences in sex distribution between groups, one included the main effect but not the interaction of sex in their survival analysis, and one showed no difference in recovery time between males and females without stratifying by aerobic vs. stretching exercise intervention. The remaining 4 studies' sample sizes were too small to compare the sexes. On reanalysis of RCT 1 (Leddy et al. 2019), males prescribed THRAE recovered 6 days faster than controls (12 vs 18 days, p=0.035) whereas females recovered only 3 days faster (13 vs 16 days, p=0.761). On reanalysis of RCT 2 (Leddy et al. 2021), males prescribed THRAE recovered 7 days faster than controls (13 vs 20 days, p=0.099) whereas females recovered 1 day after controls (18 vs 17 days, p=0.456).

Conclusion: THRAE seems to be more effective for concussed male adolescent athletes than for females. An equal number of males and females in intervention groups is not an effective method of controlling for sex in exercise for concussion studies. Future studies investigating the effect of exercise for concussion treatment should have a large enough sample to stratify analyses by sex.

127 Grey Matter Volume and Fractional Anisotropy as Correlates of Cognitive Improvement in Traumatic Brain Injury Over a 6-Month Period

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ABSTRACT

Traumatic brain injury (TBI) is a leading cause of long-term disability, affecting millions of individuals each year. Survivors often face a wide range of cognitive, emotional, and physical challenges with highly variable recovery trajectories. This variability is influenced by several factors, including location and extent of brain damage, pre-existing health conditions, age, and intensity of rehabilitation efforts. Unpredictability of recovery poses a significant challenge to clinicians seeking to provide personalized rehabilitation plans. Reliable biomarkers, both neuroimaging-based and biochemical, that can predict recovery outcomes would allow for more accurate treatment planning, leading to better patient outcomes.

Purpose: The study explored how baseline neuroimaging and blood biomarkers relate to cognitive recovery in patients with TBI.

Methods: Sixteen participants with moderate to severe TBI were enrolled from hospital settings. Blood samples were collected at enrollment and analyzed for Brain-Derived Neurotrophic Factor (BDNF), Interferon Gamma (IFN-γ), Interleukin-6 (IL-6), Interleukin-8 (IL-8), Tumor Necrosis Factor Alpha (TNF-α), Interleukin-10 (IL-10), and C-Reactive Protein (CRP). Neuroimaging data were acquired using Magnetic Resonance Imaging (MRI) with diffusion tensor imaging (DTI) to assess white matter tract integrity and grey matter volume, using a region of interest (ROI) approach defined by the John Hopkins University (JHU) white matter and Harvard-Oxford cortical atlases. Cognitive function was measured using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Disability Rating Scale (DRS), and Montreal Cognitive Assessment (MoCA), with evaluations conducted at study enrollment and six-month follow-up. Spearman Rank Order Correlation (JASP) was used for statistical analysis.

Results: Initial white matter integrity, as measured by fractional anisotropy (FA), was significantly correlated with changes in cognitive scores. FA in the genu ($rs = 0.937$, $p = 0.002$) and splenium of the corpus callosum ($rs = 0.955$, $p < 0.001$) was strongly correlated with changes in RBANS - Attention scores. FA in the fornix was correlated with changes in RBANS - Total ($rs = 0.928$, $p = 0.008$), while FA in the left tapetum showed a correlation with changes in RBANS - Visuospatial scores ($rs = 0.964$, $p < 0.001$). Additionally, grey

matter volume in the right temporal fusiform cortex was correlated with changes in RBANS - Attention scores (rs = 0.975, p = 0.005). Blood biomarkers did not show significant associations with cognitive changes; however, small sample size and variability in blood draw times limit our ability to make definitive inferences.
Conclusions: White matter integrity and grey matter volume within temporal and interhemispheric regions appear to be valuable markers for predicting cognitive recovery in TBI patients. These findings support the use of neuroimaging data to guide personalized rehabilitation strategies in TBI recovery. Further research with larger samples is necessary to confirm results and refine the prognostic value of these markers in clinical practice.

128 Improving Psychological Health After Mild Traumatic Brain Injury with Building self-awareness Teletherapy (BEST)

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ABSTRACT

Objectives: To examine early efficacy of the Building Emotional Self-awareness Teletherapy (BEST) intervention at reducing alexithymia and improving psychological functioning in service members (SM) and civilians with mild traumatic brain injury (mTBI). METHODS: Forty participants with mTBI (≥ 6 months post-injury) who had elevated alexithymia and emotion dysregulation were enrolled into a single-arm, double pre-test/ double post-test study (3-month follow-up). Assessments and treatment were administered remotely.
Intervention: BEST is eight 60-90 minute sessions delivered individually to participants by a clinical research assistant. It incorporates psycho-educational lessons and skill-building exercises teaching 1) the value of emotional self-awareness; 2) more specific and precise labeling of emotions; 3) how to recognize signs of emotional arousal and link sensations with emotions; and 4) how to identify and differentiate multiple co-existing emotions. Lessons revolve around an emotional compass as a guide to greater clarity into their feelings.
Preliminary Results: Participants were enrolled from 18 different states; had a mean age of 41 years old; were 55% male; and were predominantly White (77.5%) and non-Hispanic (90%). On average, participants were 13.22 years post-TBI. Retention is currently 97.5%. Preliminary analyses examined outcomes immediately post-intervention (n=27) and the 3-month follow-up (n=20). Results indicate significant improvements in alexithymia, emotion regulation, resilience, post-traumatic stress, anxiety, depression and anger, immediately and 3-months post-treatment (all p's <.001 except anger and depression which were <.05. Respectively, 92.5% and 74% improved by ≥.5 standard deviation (SD) on our co-primary outcomes-alexithymia (Toronto Alexithymia Scale 20; TAS-20) and emotion dysregulation (Difficulty with Emotion Regulation; DERS), after receiving treatment, compared to 15% and 4% who had ≥.5 SD improvements between the double baseline (no treatment) period. On the Patient Global Impression of Change (PGIC), 85% of the sample (n=27) reported a noticeable change (≥5; moderately to a great deal better) in "emotional functioning" after treatment. Ninety-six percent agreed the training was relevant to their needs; 100% agreed they would use the lessons from the training in their daily life; 96% agreed they would refer a friend in similar need to the study; 88% agreed the program helped them deal more effectively with their emotions.
Conclusions: The high satisfaction and retention rates are very encouraging, especially for individuals with alexithymia who frequently struggle with traditional psychotherapy. Further, preliminary findings suggest that BEST may be effective at improving psychological health in individuals with mTBI who are many years post-injury, with sustainable results. However, randomized controlled trials in larger, more racially and ethnically diverse samples are necessary to better understand the benefits of BEST in the TBI population.
Disclaimer for Dr. Pickett: The views expressed in this abstract are those of the authors and do not necessarily reflect the official policy of the Department of Defense or the US Government.

129 Twenty-Year Trends In Traumatic Brain Injury Involved Consumer Products Among Older Adults In The United States, 2001-2020

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ABSTRACT

Background: Traumatic brain injury (TBI) is a significant public health concern. Consumer product-related brain injury (CP-TBI) is common and more frequent in older adults, resulting in poor outcomes. Understanding CP-TBI trends and risk factors in older adults may inform and contribute to implementing effective prevention strategies reducing incidence, morbidity, and mortality.
Methods: Serial cross-sectional data extracted from the National Electronic Injury Surveillance System (NEISS) for 2001-2020 were analyzed. The incidence rate of CP-TBI (TBI-IR) was the primary outcome, calculated as a number of cases per 100,000 population using statistical weights and standardization using the U.S. Census population corresponding to calendar year by sex and age groups. Joinpoint regression was used to examine temporal trends for TBI-IR changes in magnitude and direction illustrated by annual percent changes (APC) and average annual percent changes (AAPC).
Results: Approximately 54.1 million older adults aged ≥ 65 years arrived at EDs for CP-related trauma care (CP-ED) in 20

years, accounting for 20.0% of all CP-ED visits. Of these, 8.6 million patients sought TBI care, accounting for 15.9% of all CP-ED, with an average of 429 thousand CP-TBI cases and an increased TBI-IR of 5.8% annually. Most CP-TBI patients were women (57.5% vs. 42.5% men) with higher TBI-IR in females than males, strikingly after 2007, highest in the group of ≥ 85-year-old males and females.
Joinpoint regression models revealed overall TBI-IR trends in older adults segmented into three periods by two joinpoints in 2007 and 2010, with an AAPC of 5.8% and higher in females (6.4%) than males (5.8%). The highest AAPC change was in the 75-84-year-old males (9.5%). TBI-IR increased significantly in females in all three segments, with an APC of 7.2% in 2001-2007, the highest APC of 16.9% in 2007-2010, and a slower increase of 2.9% APC in 2010-2020. TBI-IR increased slower in males than females and had two segments, with APC of 7.5 % in 2001-2011 and 2.8% in 2011-2020. Most TBI incidents occurred at home (59.6%), followed by public property (15.7%), places of recreation/sports (13.7%), and others (11.0%). Alcohol and drugs involved at least 5.3% (higher in males) and 3.7% (no sex difference) of total CP-TBI, respectively. The most common causes of CP-TBI involved contacting floors/flooring materials, stairs/steps, bed/bedframes, bathtubs/showers, chairs, and salient activities in females and males. Football, bicycling and basketball were common causes of CP-TBI in males. Deaths involving CP-TBI were estimated at 0.13% of all CP-ED in older adults.
Conclusion: TBI-IR in older adults increased from 2001, strikingly in 2007-2010, especially in females. Effective prevention strategies should be utilized to tailor to older adults while informing families and caregivers. As part of a comprehensive safety and risk mitigation program, especially involving daily activities and bright light at home.

130 A Randomized Waitlist Controlled Trial to Examine the Efficacy of Training to Reconnect with Emotional Awareness Therapy (TREAT) for Individuals with Brain Injury

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ABSTRACT

Objective: This study aimed to evaluate the efficacy of Training to Reconnect with Emotional Awareness Therapy (TREAT) in enhancing emotional awareness and reducing alexithymia, emotion dysregulation, anxiety, depression, anger, and overall positive and negative affect in individuals with traumatic brain injury (TBI).
Setting: The research was conducted at an outpatient brain injury rehabilitation center.
Participants: A total of 44 adult participants with a history of complicated mild to severe TBI and elevated levels of alexithymia. Participants were on average 44 years old, 11.37 years post-TBI, mostly male (62%) and mostly White (79.4%).
Design: This was a randomized, wait-list controlled trial. Participants were either randomized into the immediate treatment (TREAT; n=20) arm or wait-list control (WLC; n=24) arm. Data was collected at the following timepoints: Time 1 (baseline); Time 2 (at 6 weeks); Time 3 (at 18 weeks); and Time 4 (WLC only). The TREAT arm received the intervention between Time 1 and Time 2; the WLC arm received treatment between Time 2 and 3. Therefore all participants had a post-treatment evaluation within a week of receiving the intervention and a 3 month follow-up.
Intervention: Participants underwent an eight-session structured program designed to enhance emotional awareness and the ability to label emotions accurately. Sessions were delivered in-person to participants individually by a trained clinical research assistant.
Outcome Measures: The Toronto Alexithymia Scale-20 (TAS-20; alexithymia), Levels of Emotional Awareness Scale (LEAS; emotional labeling), Difficulty with Emotion Regulation Scale (DERS; emotion dysregulation), General Anxiety Disorder-7 (GAD-7; anxiety), Patient Health Questionnaire-9 (PHQ-9; depression), State-Trait Anger Expression Inventory (STAXI; anger), Positive and Negative Affect Schedule (PANAS), and Patient Global Impression of Change (PGIC).
Results: Thirty-four participants completed the study according to protocol. Between group comparisons at Time 2 demonstrated that TREAT participants (n=18) had significant post-treatment reductions in alexithymia, emotion dysregulation, anxiety, and depression compared to WLC participants (n=16) who had not yet received the intervention (all p's < .05). Analysis of the pooled sample (n=34) revealed significant improvements in all measured outcomes immediately after and three months post-intervention, except for the STAXI and the Positive Affect subscale of the PANAS. Notably, 80% of participants reported a meaningful change in global emotional functioning and quality of life on the PGIC. Intent-to-treat analyses (n=38) yielded similar results.
Conclusions: The findings indicate that TREAT is effective in reducing alexithymia and emotion dysregulation among individuals with chronic TBI. While there were positive trends for anxiety and depression, further research employing attention-control designs is needed to account for the attention aspect of the treatment.

131 hRV Biofeedback for enhancing autonomic resilience and mild traumatic brain injury outcomes (HERO): Description of HERO study rationale, objectives and methods

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ABSTRACT

Patients with mild traumatic brain injury (mTBI, aka concussion) often suffer from persistent post-concussion symptoms (PPCS) that impair cognitive, emotional, and physical functioning. These symptoms are often resistant to standard treatments, which typically overlook autonomic nervous system (ANS) dysfunction that is characterized by sustained sympathetic hyperactivity and poorly regulated heart rate variability (HRV). HRV biofeedback (HRVB) is an intervention that normalizes and optimizes ANS activity. We were recently awarded Department of Defense grant funding to conduct a randomized controlled trial (RCT) to test whether patients in the HRVB treatment group can develop a skill (resonance frequency breathing) that allows them to achieve 'HRV coherence' (synchronization of heart rate, respiration and blood pressure) on demand and as needed, to manage PPCS and decrease overall symptom load. Secondary objectives include assessing HRVB's impact on sleep quality and quantity, cognitive function, pain, depression, and post-traumatic stress disorder (PTSD) symptoms. Exploratory outcomes include biomarkers of inflammation and neurotoxicity.

This presentation will describe the methods of our RCT. Participants (n=148; 74 per group) will be assigned to receive either HRVB or a psychoeducational control treatment via a block randomization procedure stratified by sex and military/Veteran versus civilian status. The HRVB group will undergo weekly HRVB training sessions for six weeks, practicing slow diaphragmatic breathing to synchronize HRV and improve ANS function. The control group will receive psychoeducational sessions of equivalent duration and engagement. Outcomes will be measured at baseline, at the end of treatment (week 7), and one-month post-treatment (week 11). We hypothesize that HRVB will enable patients to significantly improve their HRV coherence and reduce PPCS symptom burden compared to the psychoeducation group. We will also evaluate within-group improvements and factors affecting treatment uptake and efficacy. A budget impact analysis and participant feedback will be used to evaluate the feasibility, acceptability, and cost-effectiveness of wider-scale HRVB implementation. HRVB offers a non-invasive, scalable intervention to enhance ANS function and alleviate PPCS, and if our RCT shows its success, HRVB could become a standard mTBI treatment, improving patient outcomes, promoting resilience, and reducing healthcare costs.

132 Towards Wellness in Acquired Brain Injury Through Storytelling: The Unmasking Brain Injury Project

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ABSTRACT

Background: People with acquired brain injury (ABI) often experience a spectrum of physical, cognitive, and emotional changes. Wellness after ABI is independent of functional status, suggesting that enhancing wellness can elevate the quality of life and foster a sense of purpose, even though underlying changes may remain. An emphasis on wellness redirects rehabilitation strategies towards promoting well-lived lives, considering meaningful activities that enhance the daily experience of individuals with ABI. The Unmasking Brain Injury project guides individuals with ABI in telling their brain injury story.

Methods: Guided by the Six Dimensions of Wellness (DoW; cognitive, physical, emotional, occupational, spiritual, and social health), this study aimed to understand individuals' narratives comprehensively and identify facilitators and barriers to wellness. Data were collected from the publicly available Unmasking Brain Injury website (http://unmaskingbraininjury.org/) and hosted Unmasking events available as of 1/1/24. Narratives from people with ABI (n=1019) were analyzed in three phases: 1) document-level content analysis, 2) communication unit (c-unit) content analysis based on DoW, and 3) c-unit and full narrative aggregate sentiment analysis. An inductive coding approach was applied to the intention of storytelling, with deductive coding for DoW. Sentiment analysis categorized sentences as positive, negative, neutral, or mixed.

Results: Most masks were created by people with traumatic brain injury (TBI; n=681), followed by stroke (n=190) and other ABI (such as brain bleeds or infections, n=148). We found that people with ABI used the narratives to share their stories with others and personally reflect on their ABI. Individual c-units contained all six DoW and an additional dimension of recreation. Most c-units were related to emotional, spiritual, physical, social, cognitive, and, to a lesser extent, occupational and recreational wellness. Sentiment analysis reflected positive c-units related to spiritual, social, and recreational health, which may be representative of facilitators of wellness. Negative c-units may be considered barriers to wellness, primarily physical, cognitive, and emotional health. Emotional health was also identified as mixed, emphasizing the challenge of pursuit of wellness post-ABI.

Discussion: Grounded in personal experiences, Unmasking Brain Injury narratives serve as a powerful tool for people with ABI to reveal dimensions of wellness that serve as facilitators of wellness (spiritual, social, and recreational health) and those that may act as barriers to wellness (physical, cognitive, and emotional health). Given most people who created a mask used it as a platform for community education, as well as personal reflection, this modality of communication may be particularly appropriate for facilitating conversation of holistic wellness after ABI. Future work will use mask-making in clinical or rehabilitative settings to support motivational interviewing during the assessment and treatment of ABI.

133 Trends of Fall-Related Traumatic Brain Injury In Children Arrived At Emergency Room In Texas, 2018-2022

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ABSTRACT

Background: Traumatic brain injury (TBI) is a pressing public health concern, with high mortality rates and a significant impact on brain development. It results in a range of emotional, physiological, and cognitive sequelae. TBI accounts for over 400,000 emergency department (ED) visits, 29,000 hospitalizations, and 3,000 deaths annually in US children. This study aims to evaluate trends in fall-associated with TBI in children in Texas. The findings from this evaluation may help stakeholders develop urgent and effective strategies to reduce preventable fall-related TBI incidents.

Methods: A retrospective study of TBI in children ≤18 years was performed using the Texas Trauma Registry (2018-2022). The ICD10-CM and Glasgow coma scale were used to identify TBI cases and severity. The TBI proportion and risk factors were analyzed overall and by age groups (0-4, 5-10,11-13, 14-18 years). Descriptive statistics and logistic regression were performed.

Results: Of 104,908 pediatric trauma patients who arrived at an ED in Texas, 41,402 patients (39.5%) sustained falls, and 16.8% (n=6,943) of them were diagnosed with TBI. 57.5% were male. TBI incidence was higher in males than females (17.4% vs 16.0%, p<0.0001). Falls were highest in age 0-4 (36.5%), followed by age 5-10 years (33.3%), 0-4 years old (28.1%) and 14-18 years old (13.9%). Unintentional falls accounted for 99.5% of pediatric falls. TBI-related falls were not different between urban and rural (12.5% vs 13.5%; p=0.2736). Compared to the 0-4 year age group, increasing age was associated with a lower risk of fall-related TBI by 76%, 73%, and 41%, corresponding to 5-10, 11-13, and 14-18 years old, respectively. Patients with injury severity score (ISS) ≥16 were observed in 57.2% of fall-related TBI patients, and mild TBI (GCS ≥14) was 90.8%. Higher odds of TBI risk were associated with 2.6-, 9.3- and 13.7 times in patients with moderate, severe, and critical injury, respectively, compared to mild injury. The admission of TBI-linked falls increased from 13.4% in 2018 to 22.7% in 2022, with an average odds of a 5% increase per year, although lower incidences in 2020 (12.2%) and 2021 (11.1%). The odds of fall-related TBI were associated with 2.14- and 1.89 times in 2019 and 2022, compared to 2018, respectively.

Conclusion: Fall accounted for about 40% of pediatric patients who arrived at the ED for trauma care, and nearly one-fifth of them were diagnosed with TBI, with a higher incidence in the pre-school-aged group. Trends in fall-related TBI incidence have been increasing. This underscores the need for a united effort from patients, caregivers, and coaches, as well as healthcare professionals, researchers, and policymakers, to develop and implement effective prevention strategies to reduce preventable fall-related TBI incidents.

134 The Effects of Subconcussive Head Impacts on Heart Rate Recovery Kinetics in Canadian Football Athletes

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ABSTRACT

Subconcussive head impacts during contact sports are challenging to identify and their consequences on athletes' health remain elusive. Impaired autonomic nervous system responses involving cardiac autonomic dysfunction have been reported following mild traumatic brain injury but this potential brain-heart interaction remains underexplored in contact sports. The objective of this study was to monitor the real time effects of head impact exposure on athletes' cardiovascular function during an entire Varsity Canadian football season. Heart rate recovery (HRR) segments (n=225) were extracted from 11 skill players (median [IQR] age: 23 [2] years; body mass index: 26 [1] kg/m^2) equipped with two wearable sensors (Catapult vest and Athlete Intelligence instrumented mouthguard) recording accelerations, heart rate, velocity, estimated metabolic energy expenditure, as well as fast head acceleration events (HAE), so-called impacts. The heart signal derivative was used to detect HRR segments which were then matched with the number and intensity of HAE previously sustained during the game by each

athlete. Following a single HAE above 40g, the median HRR (ΔHR/Δt=0.461 bpm/s, n=23 segments) decreased of 19% (p=0.005) compared to segments prior to the event (ΔHR/Δt=0.569 bpm/s, n=182 segments). This reduction was also observed with HAE as low as 20g (0.474 bpm/s, n=42 segments; 30% reduction; p= 4.30e-08). These events impaired HRR and were neither correlated with metabolic energy expenditure (R^2=0.009, p=0.541) nor with peak running velocity reached before HAE (R^2=4e-04, p=0.896). This demonstrates a possible direct causal relationship between HAE starting at 20g and disturbed cardiac response potentially through autonomous nervous system dysregulation. Given the repetitive nature of subconcussive hits beyond this potential ≥ 20g head injury susceptibility range, especially in professional contact sport athletes, there is an urgent need to investigate whether or how altered heart rate kinetics could influence susceptibility and severity of head injury in contact sports.

135 The Impact of Mild Traumatic Brain Injury Among U.S. Military Personnel Involved in a Multiple Casualty Incident

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ABSTRACT

Introduction: On January 8, 2020, there was a missile attack on a U.S. military base in Iraq resulting in a multiple casualty incident. Many U.S. service members sustained injuries, including mild traumatic brain injury (mTBI). Numerous studies have detailed the adverse health and career consequences of mTBI, but none have examined the effects of mTBI in a population that experienced the same combat incident. OBJECTIVES: (1) Determine the impact of mTBI on mental health and primary care utilization; (2) describe patterns of mental health diagnoses; and (3) identify the association between mTBI and military discharge.

Patients and Methods: The study sample included 199 service members injured during the missile attack. Of these, 102 sustained mTBI and 97 sustained non-mTBI injuries. Non-mTBI injuries were used as a comparison group for all analyses. Mental health diagnoses and healthcare utilization were abstracted from electronic medical databases for individuals pre- and post-injury. The average utilization for 36-months pre-injury was calculated and used as a baseline. Post-injury healthcare utilization was calculated as the difference from baseline, separated into 3-month increments (quarters) for a 36-month follow-up period. Mental health diagnoses were identified using International Classification of Diseases, 10th Revision codes for 36 months pre- and post-injury. Post-injury military discharge was identified from administrative records. Univariate analyses compared the mTBI with non-mTBI injury groups using t-tests. A mixed linear model was used to identify longitudinal changes in healthcare utilization during the follow-up period post-injury, while adjusting for age and sex.

Results: Both groups had significantly elevated primary and mental healthcare utilization in the post-injury period compared with the pre-injury period. For the mTBI group, mental healthcare utilization was elevated up to 36 months post-injury, compared with 21 months for the non-mTBI group. Elevated primary care utilization extended to 15 months post-injury for both groups. For post-injury mental health diagnoses, those who experienced mTBI compared with non-mTBI had a significantly higher prevalence of adjustment disorder (41.2% vs. 21.6%) and post-traumatic stress disorder (PTSD; 29.4% vs. 15.5%). The mTBI group was also significantly more likely to discharge from service post-injury than the non-mTBI group (22.5% vs. 8.2%).

Conclusions: These results suggest that mental health symptoms following mTBI among military personnel can last up to 3 years post-injury, possibly manifesting as adjustment disorder or PTSD. The higher frequency of military discharge in the mTBI group highlights the potential career consequences of this injury, possibly by way of the increase in mental health diagnoses. Further research is needed to determine the best treatment options for those experiencing mental health sequelae following mTBI and how to improve military retention rates. These findings may also be relevant when developing medical plans for civilian terror attacks where blast weaponry is employed.

136 The Effects of Mild Traumatic Brain Injury on Physical Fitness Outcomes Among U.S. Military Personnel

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ABSTRACT

Introduction: Mild traumatic brain injury (mTBI) is prevalent in the military. Although previous research has examined the impact of mTBI on return-to-duty considerations and limitations, little is known about its impact on overall physical fitness. A notable problem in conducting such studies is the lack of a pre-injury measure of physical fitness, which limits the ability to identify injury-related declines. OBJECTIVE: To determine whether experiencing an mTBI is related to declines in physical fitness among military personnel taking a standardized fitness test.

Patients and Methods: This was a retrospective analysis of 2014-2020 records from the Military Health System Medical

Data Repository and Physical Readiness Information Management System. Navy personnel with mTBI history, with or without loss of consciousness, were included if they had at least one military Physical Readiness Test (PRT) within a year before and after mTBI. The sample analyzed upper body (push-ups, n=2,206), core (sit-ups, n=2,251), bike (12-minute stationary bike, n=713), and run (1.5 miles, n=1,122) components of the PRT separately. Participants with mTBI history were matched to individuals without mTBI history by age, sex, PRT component, and the time from mTBI to PRT. Pre- and post-PRT scores for the groups were compared using a paired t-test, and multivariable linear regression assessed the impact of various factors on score changes. Lastly, the reliable change index (RCI) was calculated for both groups to assess significant changes in PRT scores and compared using a paired t-test.
Results: Overall, there were no significant differences in pre- and post-injury PRT scores between the mTBI and non-mTBI groups. In multivariable linear regression, mTBI was associated with 0.95 fewer push-ups (p=.02), but this was not statistically significant after false discovery rate and Bonferroni corrections. Using an RCI threshold of ≤ -1.96, 44% of the mTBI group worsened in upper body scores, 0.9% in core, 3.2% in bike, and 5% in run scores, but these changes were not statistically different from the non-mTBI group.
Conclusions: The findings of the present study do not support an association between mTBI and declines in physical fitness among military personnel. There are several possible explanations for these findings, including the use of effective post-mTBI rehabilitation protocols, a high level of baseline health in military personnel, and motivation to maintain or return to prior fitness level following injury. In addition, changes to physical fitness resulting from mTBI could be more subtle or occur in shorter term post-injury time periods, and examining these factors requires focused testing rather than the use of existing performance data. Nevertheless, this study provides valuable information that is relevant to military personnel and health care providers, as it could help guide patient counseling on expectations for a return to prior level of functioning.

137 Diffusion Magnetic Resonance Imaging Analysis After Sport-Related Concussion in Adolescents

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ABSTRACT

Background: Sport-related concussion (SRC) is a public health concern and there are some reports of different recovery trajectories between the sexes. Advanced neuroimaging techniques such as diffusion magnetic resonance imaging (dMRI) reveal microstructural brain changes after concussion. dMRI has been used to investigate SRC in adolescents but few studies have included structural network measures regarding connectivity between brain regions and diffusion measures regarding white matter integrity. We investigated structural network and diffusion whole-brain changes in concussed versus non-concussed adolescent athletes. We hypothesized that there would be structural whole-brain differences between groups.
Methods: dMRI data (multishell [b=1000, b=2000, 46 directions] whole brain scans) were collected from 13–18-year-old adolescent athletes (n= 35) within 10 days of SRC (baseline) and after clinical recovery (follow-up). Age and sex-matched controls (n= 34) had the same data collected at baseline and 4-6 weeks later. dMRI data were preprocessed to control for artifacts and quality control was performed on the data. Two participants had poor quality data, so one concussed female and one control male were excluded. A population specific atlas was chosen, and generalized q-sample imaging (GQI) was used for reconstruction. Network and diffusion measures were calculated using the Brain Connectivity Toolbox and DSI Studio, respectively. Statistical analysis was performed using linear mixed effect models and the Network-Based Statistics toolbox.
Results: There were limited differences between the concussed and control groups and no differences between the acute injury and post-recovery timepoints. Females had greater clustering coefficients, global dissimilarity, mean diffusivity, and radial diffusivity than males. Network-based statistics showed that females had greater connectivity strength versus males and that controls overall had greater connectivity strength versus concussed. The group by sex interaction revealed that the difference in connectivity between the groups was modulated by sex. Specifically, post hoc analyses stratified by time point and sex indicated that control males had higher connectivity strength versus concussed males at both baseline and follow-up timepoints.
Discussion: Although females had greater connectivity strength than males, there were no significant differences in connectivity strength between concussed and control females. The significant results of the group by sex interaction suggest that male connectivity is more vulnerable to the effects of concussion. These results suggest that females have a different structural response to concussion than males and highlight the need for further investigation into sex-specific microstructural responses to concussion and correlation with clinical presentation and recovery.

138 The Impact Of Pediatric Concussion On Cerebellum Neurodevelopment

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ABSTRACT

Introduction: The cerebellum follows a protracted development, continuing across childhood and adolescence. A recent study on functional connectivity in 150 children aged 8-18 years with a concussion revealed altered interhemispheric connectivity between the right supplementary motor area and the left cerebellum, reflecting "cortico-cerebellar uncoupling"(van der Horn et al., 2024). However, little is known about structural development of the cerebellum following a pediatric concussion. This study aimed at characterizing cerebellum structural development in young adolescents with a history of childhood concussion from the large population-based Adolescent Brain Cognitive Development (ABCD) Study (Casey et al., 2018).

Methods: The following baseline, 2-years and 4 years follow-up data from the ABCD 5.1 (Garavan et al., 2018) curated data release were used: 1) The Parent Ohio State TBI Screen-Short Modified Report (Bogner et al., 2017) to retrospectively identify children with no-TBI (n = 9,430 ; baseline mean age = 9.9 years; 4,721 [50.6%] females) and those with a concussion (i.e., head-neck injury with loss of consciousness ≤ 30 min or memory loss; n = 319; baseline mean age = 9.9 years; 133 [41.7%] females), and 2) right and left cerebellum grey matter (GM) and white matter (WM) volumes computed on T1-weighted images by the ABCD group. Scanner effects were controlled for using longitudinal-ComBat (Beer et al., 2020). Mixed effects models (Mirman, 2017) were constructed with lmerTest_3.1.3 package in R (2023.12.1) to explore group differences at baseline and on the rate of change between ages 10 to 14 years. Sex and parental education were included as covariates.

Results: There was no group effect on the developmental trajectories of the 4 cerebellar volumes. Compared to non-injured peers, children with concussion showed similar intercept (all $p > 0.3$) and slope (all $p > 0.24$) with a significant increase of WM volumes (Estimates [p-value]; Right = 13.3 mm3 [4.74e-05]; Left = 12 mm3 [5.74e-05]) and no significant change in GM volumes (Estimates [p-value]; Right = 5 mm3 [0.3]; Left = 3.1 mm3 [0.4]). There was a significant effect of sex and education on both intercept and slope for the 4 metrics (all $p < 0.02$). Girls showed lower WM and GM volumes than boys at baseline and slower increase over time (all $p < 2e\text{-}16$). Higher level of education was associated with larger WM and GM volumes at baseline (all $p < 2e\text{-}16$) and faster increase over time.

Conclusion: This study suggests that the structural development of the cerebellum between ages 10 to 14 years follows similar trajectory in young adolescents with and without concussion. However, cerebellum development was dependent on sex and parental education. Further explorations, notably on the group*sex interaction and on brain connectivity using diffusion MRI, will be conducted to fully understand these findings.

139 Implementation of Neurologic Informed Care for Addressing Brain Injury in Substance Use Treatment: Applying Precision Implementation Strategy Reporting for Replicability and Scale

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ABSTRACT

Introduction: Implementation strategies are necessary for improving the adoption, implementation, and sustainment of clinical interventions in real-world treatment settings. However, implementation strategy descriptions often lack sufficient detail necessary for replication and understanding whether the strategies could be feasible for scaling-out interventions equitably in other settings. Brain injury (BI) rehabilitation has been slow to use implementation science to facilitate the adoption and implementation of interventions across care settings, thus hindering potential health benefits and quality of care for individuals with BI.

Objective: We describe the processes for implementing Neurologic Informed Care (NIC) – a novel approach to addressing BI through clinical staff trained to screen for BI and accommodate cognitive impairments – in substance use treatment clinics.

Methods: We utilized the Strategies, Timeline, Activities, and Resources log to detail implementation strategies used for increasing NIC adoption (defined as the number of providers who agree to use NIC) and implementation (evidence of the use of NIC). We report strategies using recommendations for implementation strategy reporting (i.e., actor, action, targets, temporality, dose, and justification).

Results: Two PhD-level investigators (actors) completed 30 activities (actions) representing 18 unique implementation strategies. During the 12-month Pre-Implementation Phase (temporality), 14 strategies were delivered across four domains: 1) Relationship development through site meetings (dose: 12 hours of preparation/delivery) with state and county mental health/addiction board leaders, clinic leaders, and staff (targets) to build buy-in and support for NIC implementation (justification); 2) Training and education (35 hours of preparation/delivery) with clinic staff to increase knowledge and skills to deliver NIC; 3) Changing infrastructure (4 hours) in collaboration with staff to document implementation of NIC components through electronic health record or self-report survey; and 4) Clinician support through preparing site-level champions (4 hours) to support local implementation efforts and ensure readiness for implementation. During the first 3-months of Implementation (currently ongoing), four strategies were delivered across three domains: 1) Providing interactive assistance to site champions through planned meetings (7 hours) to problem-solve barriers to implementation; 2) Data

audits on NIC implementation (4 hours) and feedback (7 hours) to champions to improve implementation; and 3) Booster training (1 hour) with champions and staff to enhance skills and self-efficacy to deliver accommodations. Seven staff adopted NIC across three residential treatment programs from the two clinics (100% adoption goal). Forty-seven BI screens were conducted (16 at Site 1; 31 at Site 2), and 83% were positive for BI. Although clients most commonly reported problems with emotional dysregulation, mental inflexibility, and attention, staff reported using accommodations for memory, impulse control, and comprehension most often.
Conclusions: Strategies to improve staff-level fidelity to accommodation use are necessary for improving alignment with client needs. Additional research should examine implementation costs and impacts on treatment outcomes to understand return-on-investment.

140 An Assistive Technology for Cognition for Clients with Acquired Brain injury: The Concept Map of a User-Centred Design Process and Procedure

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ABSTRACT

Introduction: In response to the significant impact of cognitive impairments on the ability of individuals with acquired brain injury (ABI) to safely and independently prepare meals, for more than 15 years our team has been working on developing the Cognitive Orthosis for coOKing (COOK). This technology is a web-based, context-aware system comprised of three key components: a) A sensor-based safety system to enhance safety during meal preparation; b) A cognitive assistance application to promote independence by providing step-by-step instructions via a touchscreen tablet. This application supports executive function sub-skills such as goal setting, planning, recipe selection, following instructions, task completion, and evaluating goal attainment; c) A configuration system allows COOK's features to be customized to the individual's specific needs. It also provides clinicians with access to COOK's logs (e.g., types of safety rule violations), enabling experts' oversight and personalized interventions. This innovative assistive technology aims to address the unique needs of individuals with ABI by offering real-time and task-specific support.
Objective: In this study, we employed the concept mapping method to elaborate the processes and procedures behind our user-centered design approach.
Methods: To ensure that the development of COOK was rooted in the real-world needs of its users, a mixed-methods approach was utilized. This involved both qualitative and quantitative studies to conduct an in-depth needs analysis, ideation, prototype design and evaluation, lab and field testing, and modifications. Additionally, usability and feasibility testing using everyday meal preparation scenarios for individuals with ABI within home and community residences were carried out. This process applied to the development of all three main components of COOK. For each step, we collaborated with various stakeholders including persons living with a moderate or severe ABI, informal caregivers, care providers, computer and rehabilitation scientists.
Results: Our needs analysis findings elucidated the influence of motivation, cognitive impairments, motor skills, and environmental factors on meal preparation for individuals with ABI. We crafted personas and scenarios to steer the iterative design of an interactive prototype, shaped by user insights. Laboratory assessments indicated COOK's efficacy in bolstering independence and safety, despite barriers such as financial limitations and software deficiencies. Using real-world validation studies after various prototype improvements, COOK showed substantial advancements in safe and independent meal preparation, while underscoring the necessity of training for successful implementation. Additionally, the support from formal/informal caregivers was seen as a valuable asset for implementing COOK in real-life contexts.
Conclusion: COOK is a promising technology for meal preparation for clients with ABI. Ongoing and future research will continue to be geared towards further enhancing COOK's capabilities, including operationalizing a recommendation system designed to facilitate the personalization of treatment options and facilitating the overall use of COOK by therapists.

141 A Cognitive Assistive Technology for Clients With Moderate to Severe Acquired Brain Injury: Prototype Evaluation and Feasibility Testing within A Residence Context

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ABSTRACT

Introduction: The Cognitive Orthosis for coOKing (COOK), is a web-based, context-aware system designed by our team to support individuals with moderate to severe cognitive impairments following acquired brain injury (ABI) in preparing meals safely and independently. This technology includes three components: (1) a sensor-based security system to monitor safety incidents, (2) a cognitive assistance application providing step-by-step instructions via tablet to increase independence, and (3) a configuration system allowing expert clinicians to tailor COOK's features to individual needs.

Objectives: This study aimed to (a) evaluate the COOK prototype features through stakeholders' feedback and (b) examine the feasibility of a modified version in an ABI residential community setting as part of the user-centered design process.
Methods: For the first objective, a qualitative descriptive approach was used, involving semi-structured interviews and focus groups with patients (n=20), informal caregivers (n=13), and experienced care providers (n=30). For the second objective, a mixed-methods single-case study approach was applied using the "Fit between Individuals, Task, Technology, and Environment" framework. A participant with cognitive impairments following severe ABI recruited after comprehensive cognitive and instrumental activities of daily living tests. The independence and safety during meal preparation were assessed pre-, mid-, and post-intervention during receiving training sessions for using COOK in a shared kitchen based on three behavior indicators: numbers of required assistance, task performance errors, and responses to safety concerns. These were compared to an untrained control task. Additionally, benefits, barriers, and facilitators of COOK implementation within the residence were explored through interviews with the participant and focus groups with the care team.
Results: At the prototype phase, stakeholders found COOK useful in increasing safety and independence for clients with ABI in both clinical and non-clinical contexts. However, they recommended comprehensive pre-assessment and thorough training by experts for successful implementation. Feasibility testing of the modified version showed a significant increase in independence and safety during meal preparation compared to the control task across all behavioral indicators. The client and care team highlighted COOK's ability to address cognitive and executive function deficits, but suggested improvements, such as installing COOK within the client's apartment instead of a shared kitchen and providing a training toolkit for all therapists in the residence. They also recommended combining other compensatory strategies such as memory notes and adding motivational elements, like rewards (e.g., new recipes, budgets), to sustain the client's engagement.
Conclusion: This study provided valuable insights to stakeholders on implementing cognitive technology in real-world settings for clients with ABI. Future research is warranted on developing a comprehensive training toolkit for end-users and care teams, as well as conducting larger-scale effectiveness studies, building on the lessons learned.

142 Functional Virtual Reality Assessments for Children with Traumatic Brain Injury: Feasibility, Design, and Evaluation of a Novel Prototype with Speech-Language Pathologists

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ABSTRACT

Background: Traditional speech-language pathology (SLP) assessments are often not sensitive to the subtle cognitive-communication deficits after childhood traumatic brain injury (TBI). Given emerging research across health-related disciplines, including with adults experiencing TBI, virtual reality (VR) has shown promise for simulating functional settings to flexibly assess complex skills in a short period of time.
Objectives: To describe the design and evaluation processes for a VR-based SLP assessment for cognitive-communication difficulties after childhood TBI.
Methods: The processes included: 1) initial conceptualization, design, and development of the VR prototype in Unreal Engine 5.1 and deployed via a Meta Quest Pro VR headset; 2) an online survey of 31 SLPs related to awareness, opinion, and feasibility of VR in clinical settings; 3) an online survey of 15 SLPs to provide expert input on the VR prototype; and 4) a codesign session with 4 SLP graduate students who trialed the VR prototype in-person. Screenshots or videos (2 minutes long) of the VR prototype will be shared during the presentation dependent on format.
Results: While having generally positive ratings of the potential application of VR to childhood TBI (Mdn = 4 or "agree" on a 5-point Likert rating scale), SLPs in the first survey identified benefits (e.g., ability to simulate functional tasks n = 21, adaptability of environments n = 10) and hesitations/challenges (e.g., client deficits n = 12, safety and ethical use n = 10) with VR. In the second survey, SLPs provided feedback on the alignment of the prototype with established SLP assessments (Mdn = 4 or "agree the assessment helps assess intended subscales" on a 5-point Likert rating scale) and ways to improve the prototype for clinical application (e.g., adding a timer, increasing distractions or background noise). The SLP graduate students rated the VR prototype "above-average to good" (M = 76.88 (SD = 5.54) on the System

Usability Scale, provided ways to improve the prototype for usability by clinicians and children (e.g., more tutorials related to VR use), and co-designed an assessment manual to accompany the assessment.
Implications: The findings from the included research development activities and studies demonstrate strong interest in VR-based assessments amongst SLPs and also provide critical insight on designs that could best support clinical practice. Ongoing and planned modifications and expansions to the prototype, as identified through these studies, will be presented to inform design and development of ecologically-valid assessments of children with TBI. Challenges and benefits of the interdisciplinary, co-design process will also be discussed with the aim of supporting other researchers, developers, and clinicians in the creation of VR-based tools for allied health clinical practices serving children with TBI.

143 Impoliteness in Work-Related Speech Samples and Potential Impact on the Employability of Persons with Traumatic Brain Injury

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ABSTRACT

Background: Social communication disorders are common after traumatic brain injury (TBI) and significantly affect workplace interaction and job retention. Linguistic politeness norms govern workplace discourse. However, omission of normative linguistic politeness markers, or potentially worse, instances of linguistic (im)politeness, are detrimental to the social standing and employability of individuals with TBI. We will present how we applied sociolinguistics to analyze social communication using measures of politeness and (im)politeness strategies in recorded language elicitations. We will outline how we elicited, collected, coded, and analyzed linguistic politeness and impoliteness using the Voicemail Elicitation Task (VET) and the Feedback/Advice Spoken Task (FAST). The VET and FAST are computer-based language elicitation tasks related to workplace communication. The VET elicits the speech acts of informing and requesting, while the FAST elicits the speech act of feedback and advice, which are more complex to execute. We expected increased instances of impoliteness and decreased politeness in the FAST compared to the VET.
Methods: In a comparative observational study of participants with TBI (n=37, 22-65 years of age with moderate to severe TBI) and healthy controls (n=25), we analyzed VET and FAST for both politeness and (im)politeness. English was the primary language in all subjects. We compared the performance between groups.
Results: Eleven participants with TBI demonstrated 27 tokens of impoliteness across 11 different types/codes (e.g., pointed criticism, threats, dismissals). Eight control participants demonstrated only six tokens of impoliteness across four different types/codes. Fewer instances of impoliteness recorded resulted in a non-normal data distribution, necessitating a non-parametric analysis for preliminary results. Comparisons of Impoliteness tokens in persons with TBI versus controls approached significance. VET measure: $U = 528.5$, $p = 0.138$; FAST measure: $U = 62.5$, $p = 0.397$. There was a significant difference in the frequency of politeness markers used; VET analysis: Politeness Markers per Minute (PMpM) $F(1,62) = 21.064$, $p < 0.001$; FAST measure of PMpM $F(1,20) = 5.111$, $p < 0.05$.
Discussion: Preliminary findings indicate that persons with TBI present with more impoliteness tokens. Additionally, persons with TBI presented a larger variety of impoliteness types/codes.
Next Steps: We will continue to recruit participants and present updated findings. Additionally, we will present data for inter-rater coding reliability. A parameter of ongoing interest to researchers is social validity ratings from naïve listeners, with data collection still in progress. We anticipate that social validity results will indicate a greater subjective impression of offense for impoliteness instances spoken by persons with TBI than control recordings. For instance, persons with TBI utilized threats, coercion, condescension, dismissals, and sarcasm, whereas controls utilized none of these personalized impoliteness types. Specific examples from recordings will be presented with consideration of the workplace context when interpreting the results.

144 Medication Use and Polypharmacy 4 to 48 Months After Traumatic Brain Injury

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ABSTRACT

Background: Pharmacotherapy is a common practice for treating the various sequelae associated with traumatic brain injury (TBI). For example, psychotropic medications may be used to inhibit the psychological, cognitive and/or somatic impacts resulting from the injury, and several drugs may be prescribed at once (polypharmacy). However, the current literature does not provide an overall picture of the long-term use of various medications after TBI.
Objective: The objectives of this study were to 1) Describe participants' medication use (therapeutic classes, number, level of polypharmacy) over the first four years post-TBI; 2) Compare use of certain types of medication according to TBI severity, gender and age.
Methods: Participants were 491 adults (ages 18-65) with mild to severe TBI recruited from two Level 1 trauma centers (Hôpital de l'Enfant Jésus, Hôpital Général de Montréal). They were assessed at 4, 8, 12, 24, 36 and 48 months post-TBI and were asked to describe their medication intake during a structured interview. The different medications reported were classified according to the Anatomical Therapeutic Chemical (ATC) classification system. The polypharmacy level classification of Masnoon et al. (2017) was used: no

polypharmacy, minor polypharmacy (2 or 3 medications), moderate (4 or 5), or major (> 5). All prescribed medications reported were considered in calculating this index, even if the medication was related to a comorbidity (e.g., medication to control blood pressure).
Results: Descriptive analyses show that the most common therapeutic classes of medication used at 4 months post-TBI were analgesics (29%), psycholeptics (22%), psychoanaleptics (20%) and anticonvulsants (20%). These therapeutic classes remained the most frequently observed over time. The total number of medications decreased significantly ($p < .05$) with time (2.5 molecules at 4 months vs 2.3 molecules at 48 months). Around half (49%) of participants had no polypharmacy while around 25% had minor polypharmacy, 12% had moderate polypharmacy and 14% had major polypharmacy in the four years following the accident. Chi-square tests showed that compared to participants with moderate-severe TBI ($p < .05$), participants with mild TBI used more analgesics at 24, 36 and 48 months. Men ($p < .05$) used more psycholeptics than women at 24 months, and women ($p < .05$) used more psychoanaleptics than men at 48 months. Significant age differences were also observed.
Conclusions: Medication use and polypharmacy are frequent post-TBI and varies according to severity of the injury, gender and age. Future research should explore the potential impact of polypharmacy on psychological and cognitive functioning post-TBI. This knowledge could eventually help guide the development of more appropriate pharmacological plans for this population.

145 Assessing the Validity of Caregiver-Rated Severity in Pediatric TBI: A Comparative Analysis with the Glasgow Coma Scale

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ABSTRACT

Objectives: The Glasgow Coma Scale (GCS) is the gold standard in assessing severity for pediatric traumatic brain injury (pTBI) in medicine and research, yet GCS inconsistently tracks with long-term outcomes and is not frequently used outside of the medical system. A reliance on GCS-determined severity as the primary severity indicator, artificially reduces heterogeneity in research and limits the understanding of long-term outcomes following pTBI. The primary objective of this study was to compare GCS-rated severity to caregiver-rated severity. Researchers assessed levels of agreement and explored factors that explained differences in ratings. Researchers also assessed what factors determine whether a GCS score is provided in the medical record.
Methods: Researchers examined severity for 107 youth with TBI at a large US, midwestern children's hospital. Caregiver-reported severity, demographic and medical care information was collected via electronic survey. GCS-rated severity was collected via medical-chart review.
Results: There was a moderate agreement (k=0.50) between caregiver-rated severity and GCS-rated severity. The strength of agreement fluctuated at different levels of severity (mild/concussion k= 0.60, moderate k=0.1, severe k=0.64). Severity ratings did not match in 32% of cases. Caregiver severity ratings were more severe than GCS-rated severity in 62% (n=5) of cases. No medical or demographic variables explained discrepancies between caregiver-rated severity and GCS-rated severity at levels of statistical significance. Just over one-third (38%) of total participants had a documented GCS score in their medical record. Binomial regression modeling found that only highest acuity of care significantly predicted whether a GCS score was provided. Participants seen in the Emergency Department were more likely to receive a GCS rating, compared to those seen in urgent care or pediatrician/clinic offices.
Conclusion: The results suggest that caregivers may be reliable evaluators of the severity of their child's TBI, particularly for those with mild or severe injuries. Allowing parent-reported severity as a measure of injury – and not requiring GCS-ratings - has the potential to increase inclusivity in research participation, such that participation in research is not limited to children who seek medical care, especially from an Emergency Department. These findings invite further study into the nuance of the differences between caregiver-rated severity and GCS-rated severity. More research is needed to determine if caregiver-rated severity tracks consistently with long-term outcomes or if caregivers base severity ratings on other factors outside of the initial acute injury event.

146 Unmet Community-based Rehabilitation Needs the First 12 Months Post-injury in a Traumatic Brain Injury Population with Moderate-to-severe Trauma

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ABSTRACT

Background and Aim: Rehabilitation after TBI and multiple injuries improves patients' functional outcomes, however, requires comprehensive multi-professional rehabilitation services. A discrepancy between rehabilitation provision and needs for services has been documented, many TBI survivors have unmet rehabilitation needs following hospital discharge.

There is a need for knowledge on the impact of regional variations and clinical characteristics on rehabilitation needs to optimize rehabilitation services after TBI and multiple injuries. The aim was to describe needs for community-based rehabilitation in patients with TBI and moderate-to-severe traumatic injuries at 12-months post-injury. Further, to explore associations between sociodemographic and clinical characteristics and unmet rehabilitation needs at 12 months.
Methods: A 12-months follow-up study of patients ≥ 18 years with TBI among moderate-to-severe traumatic injuries as assessed by New Injury Severity Scale (NISS) admitted in 2020 to two regional trauma centers in Norway within 72 hours after injury, and with a hospital stay of at least 2 days. Sociodemographic, injury-related characteristics, and functioning were registered. Rehabilitation needs in the municipalities were estimated by the rehabilitation subscale Needs and Provision Complexity Scale (NPCS) assessing the number of therapy disciplines, therapy intensity and vocational/educational support. Unmet rehabilitation needs at 12 months were defined as discrepancies between estimated needs at 6 months using the clinician rated NPCS-rehabilitation subscale and provided NPCS rehabilitation services at 12 months. Logistic regression analysis was used to explore associations between demographic and injury-related characteristics at baseline, functioning on the Glasgow Outcome Scale Extended (GOSE) at 6 months, and unmet community-based rehabilitation needs at 12 months. Ethics: Regional Committee for Medical and Health Research Ethics #31676.
Results: 235 patients, mean age 51.9 years (SD 17.6), 77% male were included. Mean NISS was 31.3 (SD 14.3). Mean number of injuries was 7.1 (SD 3.9). 84% had an AIS Head ≥ 3. At 12-months follow up 42% had unmet rehabilitation needs. Predictors of unmet community-based rehabilitation needs at 12 months included centrality of residence areas OR=2.18 (CI1.06-4.50) p=0.035, AIS Head ≥ 3 OR 3.35 (CI 1.13-9.88) p=0.029, and GOSE at 6 months OR 0.64 (CI 0.47-0.86) p=0.004.
Conclusions: There was a high rate of unmet rehabilitation needs in the communities at 12 months post injury. Living in less central areas, having a more severe injury, and lower functioning at 6 months post-injury increased the odds of having unmet rehabilitation needs in the community at 12 months post-injury.

147 Responses of Canadian Brain Injury Associations to The COVID-19 Pandemic: Lessons Learned Over The Second Year

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ABSTRACT
Introduction: Despite COVID-19's transition to endemic status, it has significantly impacted healthcare systems worldwide. Although more pronounced in the pandemic's early years, healthcare services, including community care organizations, rapidly adapted to evolving World Health Organization (WHO) protocols and shifting in health and social care policies. In the second year of the pandemic, WHO guidelines' focus transitioned from transmission prevention to prioritizing vaccine distribution. In Canada, brain injury (BI) associations, key providers of community care services within the not-for-profit sector, were particularly affected. Our previous study found that in the first year, BI associations faced significant challenges in implementing health safety protocols, largely due to the chronic and varied physical, cognitive, and behavioral impairments of individuals with BI.
Objective: This study aimed to explore the challenges faced by community BI associations and the adaptive strategies they made to respond to clients' needs in the second year of the pandemic.
Methods: This qualitative descriptive study was part of the larger BI Pandemic Preparedness community-based participatory research project and co-designed with executive directors of pan-Canadian BI associations. Using convenience sampling, 26 BI associations were recruited, representing about one-third of all Canadian community BI associations. Data was collected through six virtual focus groups, each involving 4-6 participants and lasting approximately two hours. Thematic analysis was conducted with triangulation of perspectives and multiple researchers.
Results: Themes generated highlight ongoing challenges for BI associations in the second year. Clients with BI faced cascading and growing daily challenges including worsening mental health and insecurity around basic needs as well as continued difficulties in adhering to public health guidelines. Participants also highlighted that people with BI experienced continued barriers to accessing digital health services, which were increasingly being used by health professionals. In response to these challenges and continued changes in the pandemic and in public health and services, BI associations were required to adapt by providing tailored support for vulnerable groups, offering hybrid service delivery, and simplifying safety protocols and vaccination-related information in plain language. Additionally, many BI associations implemented personalized services to address isolation, distress, and varying comfort levels with in-person activities, while pandemic-related grants and funds became scarce. Despite financial challenges, BI associations expanded their services to address broader social determinants of health, such as housing, food security, and substance use, while collaborating with external partners to ensure long-term sustainability. Further, BI associations shifted from crisis management to strategic planning, prioritizing staff well-being, networking, and building resilience as the pandemic continued.
Conclusions: Our findings offer valuable insights for research-

ers, stakeholders, and policymakers globally, highlighting the importance of enhancing health equity for vulnerable individuals with disabilities and improving preparedness for future crises.

148 Mechanism(s) of Dry Eye in Traumatic Brain Injury (TBI): A Case Series and Review of Current Concepts

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ABSTRACT

Introduction: Traumatic brain injury (TBI) has emerged as a significant cause of visual dysfunction, with dry eye disease (DED) being a common sequela. Retrospective studies have shown an increased prevalence of DED in patients with a history of TBI as compared to those without. Understanding the underlying mechanisms of dry eye in TBI patients is crucial for improving both diagnosis and management strategies. This presentation explores the complex interplay between the neurological and ocular systems in TBI-related dry eye – reviewing the pathophysiology of dry eye through a case series.

Methods: A case series of patients referred to a neuro-optometry clinic for visual complaints including intermittent blurred vision and photophobia secondary to dry eye after traumatic brain injury are described.

Results: Dry eye was present in this population as objectively diagnosed through slit lamp examination and fluorescein dye staining, with notably reduced tear break up time. The most common symptoms included intermittent blurry vision, photophobia that manifested as discomfort (versus pain) with bright lights and overhead lights, consistent with glare sensitivity, but minimal sensations of dryness or foreign body sensation. Patients noted relief in their symptoms with lubrication with artificial tears.

Discussion: TBI often leads to disruptions in the autonomic and sensory innervation of the lacrimal functional unit, which comprises the lacrimal glands, meibomian glands, conjunctiva, and ocular surface. This disruption impairs tear production and leads to tear film instability, a hallmark of dry eye. The brain's role in regulating these components is critical, and any injury can alter the delicate balance of tear secretion, composition, and ocular surface health. In addition, TBI affects the blink reflex, reducing blink rate and compromising the even distribution of tears across the corneal surface. This contributes to ocular surface desiccation and further destabilization of the tear film.

Central to the pathophysiology of TBI-induced dry eye is dysfunction within the trigeminal nerve, which carries sensory information from the ocular surface to the brain. Damage to this nerve may result in decreased corneal sensitivity, reducing the feedback necessary for proper tear production and blink initiation, but also underly the absence of patient's complaining about dryness or foreign body sensation. Neuroinflammation and neurodegeneration following TBI also contribute to autonomic dysregulation, further impairing tear secretion.

In addition to direct neurological damage, secondary factors such as medication side effects, insomnia/sleep dysfunction, sleep apnea, altered environmental exposures, stress, and systemic inflammation also contribute to the onset and persistence of dry eye in this population.

Conclusion: Dry eye following TBI is multifactorial, involving both central and peripheral nervous system disruptions. Understanding these mechanisms allows clinicians to tailor treatments, incorporating neuro-rehabilitation strategies and targeted therapies to improve the quality of life for TBI patients with dry eye.

152 Using The Behaviour Change Technique Taxonomy v1 (BCTTv1) To Identify The Active Ingredients Of Communication Partner Training For People With Acquired Brain Injury

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ABSTRACT

Background: Cognitive-communication impairments are common after acquired brain injury (ABI) and can negatively impact a person's return to work, social functioning, community independence and quality of life. Training a communication partner (e.g. family member, friend and/or carer) can improve the communication skills of the person with ABI, however, families are dissatisfied with existing communication partner training (CPT) and support. There is emerging evidence for the effectiveness of training for communication partners, though there is variability in the content, dosage and delivery of training. The strongest evidence is for a single programme, TBI Express, which has three different versions, though is rarely used by speech and language therapists. There is a need to guide future delivery of CPT to ensure that the minimum active ingredients are delivered regardless of content and dosage. Therefore, the aim of this study is to identify and describe the active components of the three versions of TBI Express for people with cognitive-communication disorders.

Method: The treatment manual from each of the training programmes (i.e., TBI Express, TBI Express-Adapted, and TBIconneCT) was coded using the BCTTv1. Mechanisms of action (MoA) and each behavioural change techniques (BCT) were identified and linked using the theory and techniques

tool. Reliability of coding (% agreement) was conducted for two modules representing ~20-33% of treatment content.
Results: 27 unique BCTs (range 20-25) were identified linked to 16 unique MoAs (range 15-16). The most common BCTs were providing information about social and environmental consequences; instruction on how to perform the behaviour; behavioural practice/rehearsal; and feedback on the behaviour. The most common mechanisms targeted were beliefs about capabilities; skills; and behavioural regulation. Reliability of coding BCTs and MOAs ranged from 47-50% for the first programme and increased to 67-81% for the third programme. Agreement increased as coding progressed with clearer guidance needed on the definition of the target behaviour of CPT compared with the desired outcome from achieving the target behaviour.
Conclusions: Applying behaviour change theory to TBI express has revealed unique insight into the active ingredients of training. Communication partners are anticipated to improve their communication behaviours via capabilities, skills and regulation, through SLT-delivered CPT which focuses most commonly on information provision, instruction, rehearsal, and feedback. Such insights are gathered to further refine and adapt existing interventions. The challenge of discriminating between target behaviours and desired outcomes highlights the need for further conceptual work. Future work is now needed to identify the most important active ingredients to practicing clinicians, to design and test the feasibility of an adapted CPT programme for use in the mainstream health service.

153 A Battle Without Armour": A Qualitative Study Exploring The Dating Experiences Of People With Traumatic Brain Injury

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ABSTRACT

Background: People with traumatic brain injury (TBI) consider relationships and finding someone to love as important to them in their lives post-injury. However, helping a person find love is not often a goal set by rehabilitation professionals. The dating process and meeting someone is complex. Dating requires a deep understanding of the verbal and non-verbal nuances of social interaction, which are skills often impaired after TBI. Moreover, modern dating requires an understanding and ability to navigate a range of dating sites, apps, and social media to meet someone. Little is known about how people date after TBI. The objective of this study was to explore the experiences of dating for people with TBI including their attitudes towards dating, how to find a date and skills considered important for dating.
Method: A qualitative study (2020-2023) using purposive sampling was used to recruit 10 people with TBI in the UK. Participants included 7 males, and 3 females; aged between 24-38 years; sustained either a moderate (n=1) or severe (n=9) injury; and 3-22 years post-injury. Six participants were single at the time of the interview and four were in a relationship. Participants were met via Microsoft Teams in two sessions. The first session involved the collection of demographic information, and the second session involved a semi-structured interview. The interview used a topic guide and lasted between 37-60 minutes. Interviews were transcribed verbatim and analyzed using Framework Analysis.
Results: Seven core themes were identified from the data: (1) purpose of dating; (2) sense of self; (3) disclosure; (4) stigmatizing beliefs; (5) vulnerability and other challenges; (6) disinhibition; and (7) facilitative support and strategies. Both positive and negative experiences were described across all themes with the dating process made challenging by impaired communication and behavior for people with TBI.
Conclusions: Dating is considered important to people with TBI but is complex and challenging. People described a range of experiences, skills and behaviors that led to positive and successful dates. This research helps to raise awareness and reduce the stigma for clinicians to address this important area as a meaningful activity for people with TBI. Unique insights are also added that may help inform the design and development of future rehabilitation interventions in this area.

154 Motor Performance and Daily Functioning in Childhood Stroke Survivors

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ABSTRACT

Background: Childhood stroke, occurring between 28 days to 18 years of age, encompasses two main categories: arterial ischemic stroke (AIS) and hemorrhagic stroke (HS). This study aims to investigate the motor and functional performance of children with childhood stroke in Hong Kong, as well as to examine the factors that are related to poorer functional status.
Methodology: This preliminary cross-sectional study recruited twenty-four children and adolescents (15 males, 9 females) who had experienced childhood stroke, comprising 11 cases of AIS and 13 cases of HS. Participants, aged between 6 and 18 years at the time of assessment, were excluded if they had prematurity, genetic disorders impacting the nervous system, Hypoxic Ischemic Encephalopathy, Cerebral Palsy before the initial stroke event, or traumatic brain injuries. The mean age of participants was 13.3 years (SD 3.5 years), with the mean age of stroke onset at 6.4 years (SD 5.8 years). Motor and functional performance were assessed using the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-

2), and the Functional Independence Measure for Children (WeeFIM), respectively.
Results: This study examined the motor performance of participants using the BOT-2 assessment. A significant portion of participants demonstrated below-average performance (-1.0 to –2.0 SD) in total motor composite (62.5%), fine manual control (54.2%), and manual coordination (83.3%). Poorer motor skills were associated with worse functional outcomes (r=.584, p=.003). Additionally, poorer strength and agility were associated with worse self-care (r=.563, p=.005), transfers (r=.493, p=.017), locomotion (r=.511, p=.017), and cognition quotients (r=.445, p=.033).
Conclusions: We examined the motor performance of childhood stroke survivors and identified associations between motor components and various self-care domains in children. In our cohort of childhood stroke survivors, we observed a higher incidence of deficits in manual coordination. Notably, impairments in strength and agility were more significantly correlated with challenges in daily functioning skills. These results highlight the intricate relationship between motor abilities and functional outcomes in children post-stroke, emphasizing the need for individualized interventions to address specific motor domains for optimizing functional independence.

155 Event Segmentation and Memories of Daily Life in Patients with Acquired Brain Injury: Preliminary Data

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ABSTRACT

Introduction: Event segmentation refers to parsing the continuous flow of our daily activities into discrete meaningful events (Richmond et al., 2017). Non-normative segmentation (i.e., when individuals do not identify the same event boundaries as others) has been associated with poorer memory performances in both healthy individuals and those with acquired brain injury (ABI; Zacks et al., 2016). This may partly explain the episodic memory difficulties frequently observed in this clinical population (Vakil et al., 2019). However, these results were obtained in a laboratory setting by asking participants to segment third-person videos. It remains to be determined whether the segmentation difficulties of brain-injured patients can be observed using a more ecological paradigm (inspired by the one used in Jeunehomme & D'Argembeau, 2020), and their impact on personal everyday memories.
Objective: Examining the segmentation abilities of brain-injured patients with an ecological segmentation task and determining whether these abilities predict everyday events memories assessed with a paradigm based on the sampling of daily life experiences.
Methods: Seven brain-injured patients and their matched controls were asked to perform a series of actions during a walk on a university building with a wearable camera. One week later, they were presented with a video of their walk and were instructed to segment it into meaningful events. To assess participants' everyday memories, they had to answer questions sent on their smartphone 5 times a day for one week about what they were doing at the present time (the people they were with, the emotions they were feeling, the place where they were, etc.). At the end of the week, they were asked to verbally report 5 of these personally experienced events in as much detail as possible. An accuracy score was obtained by comparing information from their verbal reports to those recorded on the mobile application.
Results: Healthy participants had a significantly better segmentation agreement than the clinical group ($t = -4.35$; $p < .001$; $d = -2.02$) and their memories of everyday events were more accurate ($t = -2.31$; $p = .03$; $d = -1.07$). The linear regression exploring if the segmentation score predicted memory performance on the whole sample did not reach significance ($t = 0.96$; $p = .35$; $f^2 = 0.32$) but this could be explained by the small number of participants.
Discussion: These preliminary results seem to confirm the segmentation difficulties of brain-injured patients and provide new insights into the cognitive changes that occur after an ABI. A larger sample will determine whether these difficulties are predictive of memory performance in everyday life, which could open new avenues for rehabilitation programs aiming at reducing memory difficulties by training brain-injured patients to segment in a more normative way.

156 Reducing Compensatory Movements During Stroke Rehabilitation Through Real-Time Feedback: Testing of an Accessible, Low-Cost Tool

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ABSTRACT

Stroke survivors often learn to accomplish functional tasks by replacing impaired movement patterns with compensatory ones that are not typically performed by unimpaired individuals. During upper limb reaching movements, stroke survivors use leaning and rotation of the trunk to compensate for impaired shoulder and elbow function. During sit-to-stand movements, lateral displacement and tilting of the trunk is used to decrease weight bearing through the more affected leg. Although compensation can improve task performance in the short term, it may limit recovery in the long term by promoting the disuse of impaired movements instead of their continued practice. Some studies have demonstrated that compensation can be reduced in the short-term through real-time feedback about compensatory movements. However, it is not known whether reductions in compensation learned through feedback are retained beyond a single session of practice.

Furthermore, there are no currently available technologies to reduce compensation using widely accessible, low-cost consumer devices. We developed a software tool that delivers real time feedback to help stroke survivors reduce compensatory movements during rehabilitation exercises through webcam-based motion tracking on commercially available devices. In this study, we asked whether a single session of movement training with feedback from this novel tool reduced compensatory movements in stroke survivors, and whether reductions in compensation were retained 24 hours later in the absence of feedback. Sit-to-stand training involved repeatedly standing up from and sitting down onto a backless chair without use of the hands. A reaching exercise involved reaching to touch targets placed on a table in a seated position. During practice, audio-visual feedback about compensatory movement patterns was delivered in real time using a commercial laptop. To measure changes in compensation due to training, participants performed 5 trials each of both the reaching and sit-to-stand tasks, both at baseline and immediately after training, without feedback. In order to measure retention of reduced compensation, participants returned to the laboratory 24 hours later to perform an additional 5 trials of both tasks without feedback. Movement kinematics were measured using 3D high speed marker-based motion capture. Force plates were also used to measure weight bearing through each leg during the sit-to-stand exercise. Trunk displacement and trunk rotation were calculated as outcome measures for compensation during the reaching task. Medio-lateral displacement of the center of mass and the discrepancy in weight bearing between the two legs were calculated as measures of compensation during the sit-to-stand exercise. We report the differences in each compensation metric, relative to baseline, both immediately after training and during the 24-hour retention test.

157 "Together is No Longer Completely Together": A Qualitative Study Exploring the Influence of Social Cognition Problems on Partner Relationships Following Acquired Brain Injury

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ABSTRACT

The objective of the study was to examine the experiences of individuals with Acquired Brain Injury (ABI) and their partners regarding the effects of social cognition problems on their relationships. A qualitative interview study was conducted. Interviews were conducted one to five years post injury, either in the participants' home or at an ABI care facility in the Netherlands.

The participants were nine couples consisting of an individual with ABI and a partner without ABI. Scores on neuropsychological tests of the partners with ABI indicated social cognition difficulties in individuals with ABI.

Individual semi-structured interviews were conducted, audio recorded, and transcribed verbatim. Two independent analysts analyzed the data using thematic analysis aimed at finding common themes across the data set. Data analysis was carried out recursively and parallel to data collection to help determine when saturation was reached.

Six themes were generated from the interview data: (1) Partners feeling disappointed, lonely, and despondent, (2) Individuals with ABI feeling insecure and ashamed of falling short, (3) Relationship roles changing, (4) The aggravating role of fatigue and sensory hypersensitivity, (5) The importance of professional help, and (6) Silver linings: Increased awareness creating closeness.

We concluded that social cognition problems have the potential to strongly affect relationships between those with ABI and their partners in many ways. Addressing social cognition problems early is recommended as it is greatly appreciated by individuals with ABI and their partners and holds promise for improving their relationship.

158 Feasibility, Face, and Content Validity of R2Play: A Multidomain Return-to-Play Assessment Tool for Concussion

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ABSTRACT

Background: Concussion is a common youth sports injury with significant implications if poorly managed. Current return-to-play assessments include symptom checks and single domain assessment of cognitive and physical recovery. However, these assessments do not reflect the speed, complexity, or skill integration required in sport and may fail to elicit symptoms associated with combined physical, cognitive and sensory demands. We developed R2Play, a multidomain concussion assessment to better simulate the demands of sport. R2Play consists of 6 tablets in a standard configuration that participants run between and tap in an alphanumerical sequence (1-A-2-B. . .6-F). Increasing physical (exercise task) and cognitive (inhibition task) loads are introduced in subsequent levels and each level is performed with two conditions (auditory interference; multidomain switching) for added challenge. This study explored clinical feasibility, face and content validity of R2Play.

Methods: Clinician-youth dyads completed the R2Play assessment. Heart rate (HR) and level completion times were

logged. Multidomain cost scores were calculated to describe performance changes between levels and conditions. Semi-structured interviews with clinicians and youth collected feedback on their experience of R2Play. Clinicians completed the System Usability Scale (SUS). Quantitative data were analyzed via descriptive statistics. Interview transcripts were analyzed via content analysis to generate categories organized by domains of feasibility, face and content validity.

Results: Five clinicians and 11 youth (10-22 years) participated. Assessment times ranged from 30-40 minutes with only minor technical challenges (e.g., momentarily unresponsive equipment). Usability was good-to-excellent (SUS=81±8.4). Youth reported that instructions were clear and the combination of running, agility (e.g., lunging, direction changes), and complex thinking made R2Play feel sport-like. Clinicians reported that R2Play enabled observation of cognitive-motor skill integration within a sport-like task. Moderate-to-high intensity exertion (peak HR=80±11% age-predicted max) was reached. Completion times were 21.8±21.1% slower and heart rate 15.0±12.2% higher for the inhibition level relative to baseline. For the exercise level, HR was 12.7±6.5% higher relative to the baseline while completion times were equivalent. Multidomain switching and auditory interference conditions increased the completion time relative to the standard/baseline level by 23.1±10.1% and 3.8±8.3%, respectively.

Conclusions: This work demonstrates initial proof-of-concept and evidence supporting feasibility, face and content validity of R2Play. Validating R2Play's level structure and cognitive, exercise, and sensory loading is an important first step towards using the tool in active rehabilitation and return-to-play decision-making. Next steps include establishing cross-site feasibility and psychometric properties of R2Play.

160 A Comprehensive Framework for Community Integration and Public Health Strategies in the Rehabilitation of Individuals with Acquired Brain Injury

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ABSTRACT

This study aims to develop a comprehensive framework for community integration and public health strategies for individuals with acquired brain injury (ABI), a condition that significantly impacts physical, cognitive, and emotional functioning. Using a Delphi method, 37 participants—including practitioners, researchers, policymakers, people with ABI, and their families—contributed their insights to construct this framework. Seven key themes emerged: Relationships, Community Access, Acceptance, Occupation, Being at Home, Picking up Life Again, and Heightened Risks and Vulnerability. These themes underscore the importance of not only physically reintegrating individuals with ABI into the community but also ensuring meaningful social, psychological, and occupational participation. The framework emphasizes the need for tailored public health strategies to mitigate risks and enhance the integration of these individuals, particularly by addressing vulnerabilities and creating safeguards. Two unique themes—Picking up Life Again and Heightened Risks and Vulnerability—highlight the specific challenges that individuals with ABI face during reintegration. The focus on these areas emphasizes the critical need for protective public health measures to ensure safe and effective community participation. This framework provides a more holistic tool for developing community integration programs and public health policies compared to previous models. It is designed to inform rehabilitation efforts, influence public policy, and guide the development of outcome measures that enhance the quality of life for individuals with ABI, particularly in community settings. The inclusion of diverse stakeholder perspectives strengthens its applicability in both public health and rehabilitation contexts.

163 Utilization of Photo-diary Treatment Intervention Protocol in Patients with Post Traumatic Encephalopathy and Ongoing Severe Short Term Memory Impairment Following Moderate to Severe Traumatic Brain Injury [msTBI]

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ABSTRACT

Objectives: To determine if a protocolized photo diary intervention can be beneficial to patients with memory impairment after msTBI.

Background: Memory impairment is a central feature of patients who suffer a msTBI. Even after clearing Post Traumatic Amnesia [PTA] by clinical metrics, many patients demonstrate persistent impairments in short term memory, which impacts their ability to recall basic daily events and participate effectively in the rehabilitation process. Specific to patients with ongoing severe episodic memory impairments, discharge back to their families and community can be complicated by the need for 24/7 care and supervision. Cognitive therapy for patients with memory deficits following msTBI typically revolves around low tech external memory supports such as a journal and written reminders to try and enhance episodic recall. In our review of the literature there has been little in the way of clinical studies that look at the use of high tech photo journaling to support this population and assist patients in laying down basic day-to-day memories.

Methods: This is a retrospective chart review of ten patients with ongoing severe short term memory deficits after emergence from PTA following msTBI. All patients reviewed were inpatients admitted to a comprehensive specialized brain injury rehabilitation unit and were being treated by a single

Speech Language Pathologist [SLP]. Patients were given a touch screen tablet device with a commercially available photo diary application. Use of the device was guided by daily interaction with the study's SLP. Patients, families, and staff were instructed to take photos with the device of the patient participating in relevant therapy activities during their day. These photos were then reviewed in the SLP therapy sessions. The primary outcome was documented improvements in day-to-day recall of events as reported by patient, family and staff members. Secondary outcome measures included length of stay in rehabilitation, functional scores at discharge [Care Tool and Disability Rating Scale], and disposition at discharge from the rehabilitation unit.
Results: All patients had documented improvement in day-to-day memory and recall at the end of inpatient treatment. Some of the patients exhibited reduced confabulations when reviewing photo diaries and some had better self-awareness of events that occurred in their day. In general, this intervention was well accepted by patients and their families.
Conclusions: The photo-diary treatment intervention was well accepted by both patients and families and has potential value in treating the ongoing memory deficits common to patients with msTBI on an inpatient rehabilitation unit. A proposed protocolized treatment intervention will be presented for discussion. Further study looking prospectively at this intervention is warranted.

164 hypnopompic/Hypnogogic Behavioral Disturbances after Moderate to Severe Traumatic Brain Injury [msTBI]. Transition State Disorders following msTBI: A Novel Framework for Understanding Agitation, Confabulation, and Maladaptive Behavior

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ABSTRACT

Objectives: Four case presentations of patients with behavioral disturbances associated with waking up or going to sleep after msTBI.
Background: Sleep disturbance after acquired brain injury is highly prevalent with some estimates putting its prevalence at > 80% on admission to an acute inpatient rehabilitation unit. In a 2005 study Baumann and colleagues found significantly lower levels of hypocretin/orexin in the CSF of patients with moderate to severe traumatic brain injury in an acute trauma center. They also found that lower levels of hypocretin/orexin correlated with deeper states of unresponsiveness. This neuropeptide is generated in the posterior lateral hypothalamus and is thought to be critical in the "Flip/Flop Switch" model of sleep and wake cycles proposed by Saper and colleagues. In the past two decades hypocretin/orexin has been found to be either extremely low or even absent in patients with Type 1 and Type 2 Narcolepsy a clinical syndrome the hallmarks of which rest in having indistinct boundaries between states of Rapid Eye Movement (REM) sleep and wakefulness. The porous demarcation between these states leads to the remarkable clinical phenomena associated with this neurologic disorder such as cataplexy, hypnopompic or hypnogogic hallucinations, and sleep paralysis. REM Sleep Behavior Disorder (RBD) has also been described in patients with narcolepsy.
Results/Discussions: Four case studies of patients on an inpatient rehabilitation unit after msTBI are presented. All four appear to have marked difficulty distinguishing between dream and waking state. It seems reasonable to describe this as a 'transition state disorder' specific to emergence from msTBI. Two patients with extreme agitation had many characteristics of RBD with violently acting out adversarial dream state behavior. The other two patients more closely resembled subjects coming out of either hypnopompic or hypnogogic states with bizarre delusional reality systems and marked confabulation.
In this presentation, we describe the syndromic profile of these four patients and propose a classification system that could help the clinician identify similar patients with this syndrome. Established diagnostic criteria for transition state disorder after traumatic brain injury will help us better understand the prevalence of this disorder in this patient population as well as help the development of appropriate treatment strategies. The authors will also provide a rational neuropharmacological approach to this syndrome.

165 A Systematic Review of the Prevalence of Physical Perinatal Intimate Partner Violence and it's Implications for Probable Violence-Caused Brain Injury

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ABSTRACT

Background: Approximately 25% women experience intimate partner violence (IPV) during the perinatal (pregnancy through 24 months postpartum) period. Most physical IPV involves blows to the head, face, and neck and/or episodes of strangulation, which could result a brain injury (BI). These BIs tend to be mild, occur repetitively over the course of months or years, are remote in time, and result in chronic symptoms and psychopathological comorbidities. Pregnancy and childbirth could be a time of vulnerability to violence because of changes in physical, emotional, social, and economic demands and needs. Perinatal IPV (P-IPV) may impact the health of the child bearer, developing fetus, and post-birth child. The prevalence of physical P-IPV has not been recently explored. Therefore, the primary objective of this review was to describe the prevalence of physical P-IPV during the perinatal period. Secondarily, we wished to determine the probable linkage between the physical P-IPV and BI based on the available literature
MethodsMETHOD: Medline (PubMed), Embase, CINAHL and PsycINFO were searched (2000 - 2023) using the PIO

(Population, Issue, Outcome) model, MeSH terms, and Boolean operators (AND, OR). Studies that described the prevalence of IPV during the perinatal period were included. Reviews, meta-analysis, case study/reports, and qualitative studies were excluded. Forest plots were generated to summarize the effect size-weighted averages for prevalence and visualize the prevalence of physical P-IPV findings.
Results: In total, 55 articles were included in the review. The effect size-weighted average prevalence of physical IPV during pregnancy was 13.5% (n= 48) and during the postpartum period was 18.3% (n= 16). Insufficient data was available to calculate the prevalence of physical P-IPV across the entire perinatal period (pregnancy and 24 months postpartum) as only one study included in the review measured physical P-IPV across the entire period (prevalence= 3.8%). The effect size-weighted average prevalence of physical IPV was highest in Africa during pregnancy (average 17.9%, n= 25), and was highest in Asia during the post-partum period (average 30.3%, n= 6). Similarly, the effect size-weighted average prevalence of physical IPV was highest in low-income countries during pregnancy (average 18.0%, n= 18) whereas it was highest in lower middle-income countries during the post-partum period (average 31.0%, n= 6).
Discussion and Conclusion: The prevalence of physical P-IPV remains a looming threat to child bearer, fetal, and early childhood health. Given the > 80% prevalence of IPV-BI among survivors of physical IPV, further research that directly examines the possibility that BI is also occurring in the perinatal population should be undertaken to uncover the true prevalence and impact of perinatal IPV-BI, prevent P-IPV, and improve the response to P-IPV and perinatal IPV-BI.

166 A Novel Approach to Patients with Maladaptive Behavior on an Acute Inpatient Rehabilitation Unit Following Acquired Brain Injury (ABI):The Utility of Applied Behavioral Analysis (ABA) in the Rehabilitation Setting

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ABSTRACT

Objectives: To determine if ABA interventions can be a useful approach to maladaptive behavior in acute rehabilitation setting following ABI.
Background: Behavioral disturbance after acquired brain injury (ABI) can be considered within the framework of a temporary dysfunction of fronto-temporal systems. Dysfunction of these offline neural networks leads to impaired executive function and memory encoding. These, coupled with poor insight and deficit awareness (anosognosia), lead to a loss of top down modulation of behavioral output resulting in maladaptive behavior. Consequences of such network dysfunction can range from a mildly irritable patient to one who is combative with severe impulse dyscontrol. The challenge confronting the practitioner is how to get the affected patient through this temporary period of confusion, amnesia and heighted behavioral dyscontrol – also known as post traumatic amnesia (PTA) - without injury to the staff, family or patient. The physician that is directing care in acute rehabilitation centers is often asked to manage these patients' behaviors during this period without the proper tools to manage their fronto-temporal injury.
Methods: To address an inadequacy of common approaches to behavioral disturbance arising from fronto-temporal injury, we have explored the use of ABA utilizing a Board-Certified Behavioral Analyst (BCBA) on an acute inpatient rehabilitation unit. BCBA directed ABA science is a validated and widely accepted approach that has been used for decades in the field of autism spectrum disorder and other developmentally challenged individuals, as well as in transitional programs specializing in persistent behavioral disorders after ABI. We believe that we are the first to bring such a program to an acute inpatient ABI rehabilitation unit.
Results: Since implementation of BCBA clinicians on an inpatient ABI unit there has been a marked reduction in staff injury and a reduction in costs related to managing aggressive patients with frontotemporal injury. Additionally, there was an overall improvement in staff and family confidence in dealing with the temporary period of confusion that often follows ABI.
Conclusions: This approach was found to be extremely successful in both patient and family outcomes as well as staff safety and satisfaction. Additionally, in the first year of implementation there was an estimated savings of $110,000. This presentation will discuss the integration of a BCBA into the acute inpatient rehabilitation unit and how these tools and techniques can generalize to other settings.

168 The Relationship Between Sex, Fatigue and Post-concussion Symptom Endorsement Differs Between Those With Mild Traumatic Brain Injury and Those Without, in the Post-acute Period

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ABSTRACT

Sex, fatigue and subjective sleep disruption have been shown to be associated with poor subjective recovery after mild traumatic brain injury (mTBI). This study aimed to determine whether the relationship between these factors and post-concussion symptom (PCS) reporting are unique to individuals who have incurred a mTBI. A group of 208 premorbidly healthy adults was assessed with measures of fatigue (Multi-dimensional Fatigue Inventory), subjective sleep disturbance (Pittsburgh Sleep Quality Index), depression (Inventory of Depressive Symptomatology) and anxiety (Beck Anxiety Inventory) symptomatology, and PCS endorsement (Rivermead Post Concussion Symptoms Questionnaire). Individuals who were admitted to hospital approximately 8-weeks prior with systemic traumatic injury and mTBI

(mTBI; n = 86) and with systemic traumatic injury without head strike (TC; n = 46) had equivalent and elevated levels of fatigue, subjective sleep disturbance and PCS endorsement relative to a healthy community-based control sample (HC; n = 76). Female sex (p = .028) and an elevated sense of general tiredness (p = .037) were significant independent predictors of PCS endorsement in the mTBI group, but sex did not independently predict PCS reporting in either the trauma or healthy control groups (p > .05). Psychological status was the only variable that independently predicted PCS reporting in all groups. This study suggests that the vulnerability of females to report elevated PCS in the post-acute period after traumatic injury may be specific to those who have incurred a concomitant mTBI. The factors that may be contributing to this pattern of performance will be highlighted. Further, only some subcomponents of fatigue are independent predictors of PCS reporting, with the groups showing variability in these associations. This suggests that more detailed consideration of fatigue subcomponents may be warranted when treating or managing these individuals.

170 Cognitive Exercise Engagement by Adults with Chronic Moderate-to-Severe Cognitive Impairments Post-Acquired Brain Injury: Benefits and Challenges

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ABSTRACT

Ongoing engagement in cognitive exercise is a key pillar of brain health and can result in benefits to individuals with and without acquired brain injuries (ABI). A growing body of evidence supports that exercise-facilitated neuroplasticity can enhance brain health, function, and quality of life. Four studies led by this presenter will be summarized: 1) two studies that examined cognitive benefits of cognitive exercise to adults with chronic moderate-to-severe (m-s) cognitive impairments post-ABI; 2) one study that examined motivational challenges to cognitive exercise engagement by adults with m-s cognitive impairments post-ABI, and 3) one study that examined cortical stimulation associated with various cognitive exercises as measured by electroencephalography (EEG). Regarding the two studies addressing cognitive benefits of cognitive exercise: 1) results of a 5-month, 5-day/week individual computerized cognitive exercise comparison group pilot study (n = 14) revealed that performance by the exercise group versus the control group on auditory memory and verbal fluency standardized assessments significantly improved (M=8.43, t(10) =3.40, p=0.0068; M=15.40, t(10)=2.51, p=0.0310 respectively), with the majority of exercise group participants subjectively reporting that program engagement positively impacted their cognitive abilities and everyday function; and 2) results of a 12-month weekly group cognitive exercise pilot study (n = 10) revealed that participants post-group Brief Test of Adult Cognition by Telephone Composite z-scores were significantly better than their pre-group composite z-scores (M = -0.7240, t (9) = 4.0637, p = 0.0028). Regarding the study addressing motivation to engage in cognitive exercise, results of a mixed methods study (n = 34) revealed that participants perceptions of motivational facilitators included 'receipt of positive reinforcement for exercise activity', 'possession of needed information to engage in exercise', and 'possession of exercise-related goals' and that their perceptions of motivational barriers included 'absence of exercise-related goals' and 'absence of consistent structure conductive to exercise'. Regarding the study addressing selection of cognitive exercises based on cortical stimulation associated with them as measured by EEG (n = 25), in left dorsolateral prefrontal cortex (LDLPFC) coherence comparisons between 'most cognitively challenging' and 'least cognitively challenging' activity conditions, coherence was significantly higher for Sudoku, the activity rated 'most cognitively challenging' by most participants, than for 'least cognitively challenging' activity conditions at F3-AF3 in high beta (p = 0.0215); at F3-Fz in beta (p = 0.0327), theta (p = 0.0012), delta (p = 0.0266), and high delta (p = 0.0171); and at F3-FC1 in theta (p = 0.0105), delta (p = 0.0171); and high delta (p = 0.0171). In comparisons between Sudoku and an 'at rest' condition, LDLPFC coherence was significantly higher for Sudoku at F3-FC1 in theta (p = 0.0479), delta (p = 0.0327), and high delta (p = 0.0327). Collective implications of the findings of these studies will be discussed.

171 Context Matters: A Scoping Review of Cognitive-communication Interventions That Support Meaningful Engagement with Adolescents Following an Acquired Brain Injury.

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ABSTRACT

Background: Adolescence represents a unique and dynamic developmental stage where high-level cognitive-communication skills (e.g. problem solving, abstract reasoning, attention, metacognition) undergo refinement and consolidation in an environment of heightened neuroplasticity. An acquired brain injury (ABI) during this critical period can disrupt development and compromise a young person's social, academic, and vocational outcomes. An emergent body of literature exists to inform speech language pathologists' choice of evidence-based treatment options following a brain injury in adults. However, comparatively few studies relate to adolescent populations, and fewer still include adolescents with lived experience of ABI as stakeholders in the design of interventions. There is broad consensus among researchers that effective treatment approaches for any age group should be tailored, functional, meaningful, and contextually relevant to the individual.

Objectives: To (1) synthesise the current evidence-base on cognitive-communication interventions for adolescents with an acquired brain injury, (2) examine the extent to which

these interventions incorporate adolescents with lived experience of an acquired brain injury as stakeholders in the design process, and (3) identify research gaps.
Methods: This scoping review used Arksey and O'Malley's five-stage methodological framework and the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Extension for Scoping Reviews). In March 2024, a comprehensive search of 5 databases and grey literature was conducted. Qualitative and quantitative data were extracted, thematically analysed, and interpreted descriptively to identify key patterns related to stakeholder engagement and intervention design.
Results: 59 studies met inclusion criteria after screening 2475 studies and reviewing 186 full texts. Preliminary results indicated that lived experience feedback was sought solely at the end of the intervention design process in the vast majority of studies. Multiple studies reported stakeholder evaluation of an intervention's usability and acceptability, often at the same time as validity and feasibly were evaluated. However, studies seldom included adolescent stakeholders in the early planning and iterative development stages. The inclusion of formal or informal descriptions of the intervention design process were either brief or absent.
Conclusions: Adolescents require tailored intervention approaches that are rewarding, meaningful and contextually relevant. Current intervention design methodologies lack descriptive detail regarding the design process, and preference the collection of retrospective evaluation about an intervention's usability and acceptability, rather than iterative inclusion of adolescent lived experience perspectives across the lifespan of the design stages (planning, development, delivery, and evaluation). These results will inform the iterative design of a novel cognitive-communication treatment program with adolescents with a brain injury as co-researchers, ensuring their lived experience perspectives inform each stage of the intervention design process.

172 Diverse Experiences of Participation: a Qualitative Study

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ABSTRACT

Introduction: Participation is an outcome measure used in healthcare, conceptually imbedded in the social environment in which people live. Previous studies identified meaningfulness, self-determination, and a sense of belonging as defining qualities of participation. Participation measures vary in their focus on objective (e.g. independence or frequency) or subjective components, and vary in their included activities, resulting in limitations in comparing outcomes. Most studies show the primary predictors of participation are social factors including race, education, and marital status of the individual with the TBI, rather than injury severity, which highlights the impact of these social determinants of health.
Purpose: This study seeks to explore the relationship between the experience of participation and the social environment to understand disparate outcomes. This study used a social ecological perspective to explore how persons of color with TBI experience participation in relation to immediate support, community, and societal systems.
Methods: The qualitative study interviewed dyads consisting of a person of color with a TBI and a person they identified as important in their lives. The design used stratified purposive sampling across age group, gender, race, and participation outcome score on the PART-O. Data collection included an interview with the dyad and observations on a brief activity, providing dialogic narrative, visual narrative, and behavioral observations.
Results: The first stage of analysis used the themes meaningfulness, self-determination, belonging, (dis)satisfaction, and the social ecological levels of immediate support, community, and society. Variations were identified across all participation qualities. In some experiences, solitary, immediate social environment, and community functioned separately; others chose activities at one level based on another social level. Data reflected a complex interplay between the brain injury and other social and medical issues impacting participation. Gaps appeared between the positive narrative of some persons with TBI and their paucity in participation performance.
Conclusions: The breadth of variation in experiences of participation suggests quantitative measures need to allow for variations. Participation is best understood through both subjective measures, including resilient narratives, and objective indicators of performance. Healthcare practices should incorporate the person's medical and social complexity into individualized interventions and goals, and programs based on a social model could better address the barriers to participation.

173 Analysis of Injuries from Hits to the Head in Young Children Presenting to Pediatric Emergency Departments in Canada

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ABSTRACT

Introduction: Hits to the head are a common occurrence in early childhood. Yet, most epidemiological studies have grouped children into broad age categories, such as 0 to 5 years, assuming similar trends in mechanisms or diagnoses. Early childhood is a period of rapid change, suggesting that such groupings might hide actual trends, which could be targets for injury prevention initiatives. The purpose of this study was to describe the patterns of all injuries in children aged 0 to 59 months presenting to Emergency Departments (ED), with a focus on the different diagnostic outcomes for those presenting with a hit to the head.
Methods: Data were obtained from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), a surveillance system based on EDs in Canada. Patients who

consulted between 1994 and 2024 were selected. For those who consulted following a hit to the head, diagnoses were categorized into five groups: a) no head injury (noHI) (i.e., bruises, lacerations to the head/face, or no injury), b) minor head injury (MHI), c) concussion, d) fractured skull (FS), and e) moderate to severe traumatic brain injury (msTBI) (positive scan). As this was historical data, we maintained the original diagnostic nomenclature, thereby separating MHI from concussions.
Results: Over 1.1 million injury-related ED visits were analyzed. All injuries varied according to age and gender. For example, the number of poisonings increased up to the age of 25 months and then decreased until the age of 59 months. For burns, numbers increased until the age of 15 months, decreased until the age of 32 months, and remained stable thereafter. Interestingly, between the ages of 11 and 16 months, boys had nearly twice as many burns as girls. When considering those who consulted for a hit to the head, final diagnoses also varied by age and gender. The noHI and MHI categories followed exact opposite trends, with younger children having the highest percentage of noHI and older children having the highest percentage of MHI. The age at which the percentages for both diagnoses were the same was 16 months for boys and 23 months for girls. Concussions remained stable across ages, at around 6% for both girls and boys, as did msTBIs, which were at 1%. FS were highest immediately following birth and peaked at 3 months (15%) for boys and 2 months (10%) for girls, then rapidly decreased, stabilizing at 1% by the age of 12 months.
Conclusions: This study highlights that injuries in the early stages of life, especially those following a hit to the head, vary greatly from one month to the next. Using broad age categories may be misleading and could obscure trends that might serve as targets for injury prevention initiatives.

174 Early Vocational Rehabilitation For Return To Work After Traumatic Injury: A Randomised Controlled Trial

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ABSTRACT
Background : Returning to work (RTW) is an important goal for individuals sustaining traumatic injury [Multi-Trauma Orthopaedic (MTO), traumatic brain injury (TBI), spinal cord injury (SCI)]. Vocational rehabilitation is often unavailable or delayed, and controlled evaluation limited.
Objectives: This study evaluated the impact of providing an Early Intervention Vocational Rehabilitation Service (EIVRS) following traumatic injury on employment outcomes, mental health and quality of life one and two years post-injury.
Methods: A randomized parallel two-group design was used to compare the EIVRS group with a control group receiving usual rehabilitation. Outcomes included hours worked and time to return to first job (primary outcomes), anxiety, depression and quality of life one and two years post-injury. Participants were adults aged 16-70, employed pre-injury. Eighty-eight EIVRS treatment and 82 controls were recruited; mean 47 days post-injury, 75% male, mean age 38 years. Dedicated EIVRS therapists provided activities associated with fostering hope for RTW, thinking about, preparing for, returning to work, building RTW goals into rehabilitation, employer liaison and peer support.
Results: There were no significant group differences in employment outcomes at one year, but EIVRS participants reported lower anxiety. Quantile regressions revealed that at two year follow-up, the EIVRS group worked more hours (Median=38; IQR: p25=24, p75=40) and took significantly less time from injury to RTW (Median=166 days; IQR: p25=87, p75=279.5) than controls (Median=28.5; IQR: p25=23, p75=35.5; p=.018; and Median=238 days; IQR: p25=143.5, p75=325; p=.04, respectively). Quantile regressions by diagnosis showed a significant main effect of group (p=.02) but no interaction between group and diagnosis (p=.60). Trends for shorter time to RTW were strongest in the MTO and TBI groups at two years. At two years there were no group differences in anxiety, depression or quality of life.
Conclusions: Offering EIVRS may reduce time to RTW and increase hours worked two years after traumatic injury.

175 The Prevalence And Impact Of Acquired Brain Injury In Perpetrators Of Violence And Abuse: A Practitioners Experience.

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ABSTRACT
Acquired brain injury (ABI) is a significant yet often overlooked factor in violent behaviour, particularly in the context of domestic abuse. Previous research has indicated that ABI is more prevalent among those who have committed violent offences compared to the general population, with some studies suggesting a higher risk of reoffending among those with ABI (Farrer et al., 2012; Williams et al., 2010). This qualitative study explores the experiences and perceptions of practitioners working with individuals who perpetrate violence and abuse, focusing on the prevalence of ABI and its impact on rehabilitation and engagement with services. Semi-structured interviews were conducted with seven practitioners across probation services, prisons, and third-sector organisations, allowing for in-depth insights into the challenges faced when working with this population.
Thematic analysis revealed five critical themes: (1) Lack of training and awareness of ABI, as practitioners often reported feeling unprepared to recognise or address brain injuries in their clients. (2) Resource constraints, which hinder the provision of adequate support and specialised interventions for individuals with ABI. (3) The need for tailored interventions that accommodate the cognitive and behavioural challenges

posed by ABI. (4) Identification and screening challenges, with many practitioners acknowledging the absence of formal tools to screen for ABI in violent offenders and (5) The impact of ABI on behaviour, particularly in how it affects the ability of individuals to engage with rehabilitation programmes, leading to higher rates of recidivism. An overwhelming unexpected gap highlighted in this study is that female offenders (who have perpetrated violence) are not supported to identify ABI, nor do they have access to relationship based behaviour change programmes related to violent offences.
Practitioners expressed concerns about the lack of formal training on ABI and emphasised the need for better resources and support systems to address the unique needs of this population. Many reported relying on incidental knowledge or informal briefings, which are insufficient for dealing with the complexities of ABI-related behavioural issues (Farrer et al., 2012). The findings suggest that there is an urgent need for systemic changes, including the introduction of standardised screening tools, improved training for practitioners, and more comprehensive intervention programmes tailored to those with ABI.

176 Putting Family Before Patient: Physicians' Reasons For Prolonging Life In Chronic Disorders of Consciousness

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ABSTRACT

Introduction: The Netherlands have the lowest prevalence of prolonged disorders of consciousness (such as the unresponsive wakefulness syndrome and the minimally conscious state) reported worldwide. This is thought to reflect the specific Dutch ethical context in which treatment decisions in brain injured patients are made. Since the 1990s, physicians here have been allowed to discontinue life-sustaining treatment, including artificial nutrition and hydration, in patients with prolonged disorders of consciousness. In some cases, formally they can even be considered to be obliged to do so, specifically if a patient has no chance of recovery of consciousness or if he or she is presumed not to have given their consent for the continuation of treatment, were they able to communicate their wishes. However, even in this context some patients are treated way beyond the timeframe in which recovery is expected, sometimes against their presumed wish. In this study, we interviewed physicians on their reasons to do so.
Methods: semi-structured interviews with physicians of patients with CRS-R based diagnoses of unresponsive wakefulness syndrome at a mean of 14 years after injury, starting with the question: 'what factors influence or influenced your medical treatment and decision-making in this specific case?'; qualitative analysis using Atlas.ti.
Results: 10 physicians (all elderly care physicians working in nursing homes), responsible for 9 patients, were interviewed. The patients' family's wish to have life-sustaining treatment continued was decisive in all cases and overruled factors such as diagnosis, prognosis and patient perspective. Physicians focused on their relation with the family, steering away from conflict. No external expertise was involved. The physicians considered themselves responsible for continuing life-sustaining treatment and took on a wait-and-see approach with regards to advance care planning even though this in their opinion resulted in an insufficient quality of life for their patient – a mean score of 1.6 on a scale from 0 (worst quality of life) to 10 (best quality of life). They all stated that they would not want to be treated the way they treated or had treated their patient. The weight of the family's standpoint became clearest from the answers to the question what they would do if the patient had no family. Without exception, the answer was that in that scenario the physicians would discontinue life-sustaining treatment.
Conclusions: Physicians may continue life-sustaining treatment in patients with prolonged disorders of consciousness for decades, even if chances of recovery are considered negligible, the patient would presumable not give consent for the treatment they receive, and continuation goes against professional standards. The patient's family is considered decisive in these cases, with physicians focusing on maintaining a good relationship with them while giving the patient's perspective or presumed wishes no relevant position in the treatment plan.

177 Cognitive Rehabilitation Following Pediatric ABI: Results From A Randomized Controlled Trial

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ABSTRACT

Acquired brain injuries in pediatric age are frequently associated with cognitive impairments, which may worsen over time and cause difficulties in adjustment, learning, and interpersonal relationships. Although recommendations highlight the need for early rehabilitation for this population, to date there are no specific guidelines for rehabilitation interventions in children. The aim of this randomized controlled trial was to compare two different multi-domain cognitive interventions for children with ABI aged 5 to 17 years in the subacute phase (immediately after the emergence of consciousness), to evaluate whether either format could be more effective than the other. Both interventions addressed the following cognitive domains: attention, visual-constructional abilities, memory and executive functions. Specifically, the first intervention (assigned to Group 1-G1) was based on an individualized and personalized approach, in which each patient was offered increased stimulation of the most impaired cognitive function-

(s), along with the parallel stimulation of the other cognitive domains. On the other hand, the second intervention (assigned to Group 2-G2), was based on a 'fixed dose' stimulation of each cognitive function in a predefined, sequential order. Both interventions had a duration of 12 weeks and included 3 daily sessions (neuropsychological treatment, speech therapy and psychoeducational treatment) for 5 days a week. Forty patients were randomized into the two study groups and were scheduled for cognitive assessment at baseline (T0) and post-intervention (T1). Immediately after the start of the intervention, one patient was excluded from G2 due to clinical reasons, so a final sample of 39 patients was considered for statistical analyses. Among these 39 patients, 34 completed the assigned intervention, 18 in G1 and 16 in G2. After the intervention, improvements were found in all cognitive domains trained by the interventions. In more detail, the primary cognitive outcome (i.e., visual sustained attention) showed a positive change with a large effect and 14 out of 16 secondary outcomes showed an improvement, of which 13 with a medium-to-large effect. No differences in efficacy between the two intervention groups were found. The absence of a passive control group did not, however, allowed us to discriminate the rehabilitation effect alone from the time effect and children spontaneous maturation. In sum, findings highlight that a personalized rehabilitation approach does not lead to better cognitive gains than a non-tailored intervention in children with ABI in the early recovery stage, in contrast with evidence for the chronic phase. This could be attributable to the numerous cognitive deficits shown by children at an early stage, which could benefit from interventions simultaneously addressing different cognitive domains, irrespective of their format. It could be that individualized and tailored interventions are more beneficial at a subsequent stage, when everyday demands and expectations become stronger.

178 The Relationship between 24-Hour Activity Patterns, Cognition, and Symptoms in Traumatic Brain Injury

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ABSTRACT

Individuals living with the negative health consequences of a mild traumatic brain injury (mTBI) are at risk of developing poor lifestyle habits, such as low physical activity (PA), increased sedentary behaviors (SB), and poor sleep quality. Currently, research and recommendations for individuals with a TBI address sleep, sedentary time, and physical activity as separate behaviors. However, this siloed approach to treatment and research fails to capture the mutually-exclusive nature of the behaviors within a 24-hour period. Thus, this study aimed to investigate the dynamic interplay of these behaviors by assessing their frequency and distribution during 24-hour cycles in individuals with mTBI. Objective accelerometry was employed to determine if time reallocation from one behavior to another, interdaily stability (IS), and intradaily variability (IV), were associated with cognitive function and symptom severity. IS quantifies the consistency of activity patterns from one day to the next, whereas IV quantifies the degree of activity fragmentation within 24-hour cycles. Participants (n=24) were 18-55 years of age (29.81 ± 11.39), experienced a mTBI inducing injury within the year and were physician-diagnosed Participants wore an Actigraph GT3X for seven consecutive days, completed a symptom checklist (10.45 ± 13.75), and the Trail Making Test (TMT) (48.73 ± 24.04). Compositional data analysis was used to assess time allocation of four behaviors, sleep (367.14 ± 57.62), SB (688.34 ± 99.50), light PA (LPA) (201.34 ± 57.08), and moderate to vigorous PA (MVPA) (96.04 ± 41.12). IV (0.47 ± 0.25) and IS (0.80 ± 0.12) were calculated using ggir in R. Results revealed that reallocating 20 minutes into LPA from an equal amount of all other behaviors was significantly associated with faster TMT B by five seconds (β= -39.22, p=0.05). Moreover, reallocating 20 minutes from MVPA into LPA was associated with a -9 second decrease in TMT B (β=-42.06, p=0.05). Additionally, the same pattern exists with symptoms. β= -55.97, p=0.02). Relocating 20 minutes from MVPA to LPA was associated with a 12-point decrease on the symptom scale (β=-62.97, p=0.01). Moreover, results showed that those with higher IV had higher TMT B scores (β= 42.54, p=0.02). However, there was no relationship between IS and TMT B or symptoms. These results highlight the importance of considering overall activity patterns in TBI recovery and emphasize the need for further research on 24-hour activity cycles within this population.

180 Supporting Concussion Recovery Through Integrated Knowledge Translation: Launch of the Updated Concussion Awareness Training Tool (CATT) eLearning Modules and Resources for Parents and Caregivers, Youth, School Professionals, and Medical Professionals

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ABSTRACT

Background: While concussions among youth occur both inside and outside of the sports realm, emerging research is predominantly from the sports perspective. The 6th International Conference on Concussion in Sport prompted widespread updating of concussion training and resources. Notably, the roles of rest and aerobic physical activity supporting recovery have been considerably refined.

Objective: The Concussion Awareness Training Tool (CATT) provides free, evidence-based, concussion education and resources tailored to diverse audiences, including parents and caregivers, youth, school professionals, and medical

professionals. This presentation outlines the integrated knowledge translation practices employed to update CATT, and highlights new information and features of the 2024 relaunch of CATT.
Programme Description: Recently launched on its new online platform, CATT offers up-to-date educational eLearning modules and downloadable resources, each created using an integrated knowledge translation (iKT) approach. Content for the updated website, eLearning modules, and other resources was informed by research, content experts, and target audiences from across Canada.
Date: Since 2018, approximately 170,000 people worldwide have completed CATT training. On average, www.cattonline.com receives 100,000 visits per year from over 185 countries, including: Canada, United States, Australia, United Kingdom, New Zealand, South Africa, Ireland, Russia, Germany, India, France, Lebanon, China, and elsewhere. From October 1, 2023 to July 1, 2024, organic search was used to find CATT by >52K visitors, >26K had a direct link, and >10K arrived at CATT by referral. The SCAT-5 tool was accessed by 53,285 users. Other than the landing page and the SCAT5 landing page, the most popular pages are: CATT for Coach course page (>45K pageviews), Coach persona page (>34K pageviews), CATT for Athletes course page (>18K pageviews), and the CATT for Medical Professionals course page (>14K pageviews). Top CATT resources downloaded were Return to Sport (>975), Return to School (>700), the Incident Report (>675), Return to Work (>575), and Return to Activity (>300). With all eLearning modules available in English and French, work is underway to make modules for medical professionals, coaches, and educators available in Arabic at the request of the American University of Beirut to educate school nurses and administrators. CATT training has been mandated by >100 sporting associations, universities, schools, and other organizations across Canada and the United States. Furthermore, the University of British Columbia is the first medical school in Canada to incorporate concussion education into its 4th year curriculum including the completion of CATT for Medical Professionals.
Implications: Ensuring proper support and management is available to youth during concussion recovery is dependent on access to current, evidence-based education and resources.
Conclusion: CATT is a trusted resource to educate users on concussion recognition, treatment, management, and recovery. Recent updates provide users with current and relevant information in an accessible, no-cost format.

181 having Skin In The Game: TBI Survivor, Researcher And Service Provider Offering A Unique Perspective

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ABSTRACT

Testimonies of lived experience are a powerful way to gain insight into traumatic brain injuries (TBI), providing a voice for assisting researchers, health service providers and public health advocates. Their perspectives create holistic approaches in understanding health and social outcomes. This raises an important question: what happens when someone on the research team fits all three roles—being a researcher, a service provider, and having lived experience? This someone is me. Having experienced a TBI in early adolescence, I now work in TBI service provision and engage in TBI research. Researchers with lived experience offer "experiential knowledge", an understanding that each TBI comes with a unique set of circumstances, shaping health outcomes. Sharing experiential knowledge pushes the public health community to acknowledge recovery is not limited to clinical outcomes, but also hidden social impacts of TBI. In sharing their perspectives, they enable non-TBI researchers to gain deeper insight into what constitutes a meaningful recovery. My own TBI shaped how I understand research I conduct and the TBI-specific yoga program I implement in a neurorehabilitation centre. These elements—research, lived experience, and program delivery--function as a system, each influencing, interacting and driving each other. Personal experiences inform highly empathic interactions with patients, survivors, and their caretakers. Researchers with lived experience carry their perspectives as they interact with patients and survivors in a way that is personal—they have a different understanding of TBI and recovery challenges that accompany it. These researchers can approach TBI survivors with sensitivity and authenticity because of their shared experience. When considering TBI recovery, researchers with lived experienced that also work in the sector become an asset in how their perspectives prioritise meaningful recoveries--a recovery in which people's personal goals and needs are being met. In meaningful recoveries, individuals select activities they prefer, choose work pathways that bring a sense of purpose, and form genuine connections post-injury. Rather than "moving on", individuals with TBI learn resilience is different than recovery—it's about moving forward into a life they want to lead post-injury in the face of changes from their pre-injury self. While addressing basic needs is essential, there is an opportunity to create public health policies that move towards empowering individuals in finding their meaningful recovery. By creating supportive environments for individuals with TBIs that are inclusive, community-centred, and promote TBI-awareness, the community and TBI individual mutually benefit. When society reframes people with TBI as capable it changes how we in the TBI community view ourselves. Despite what we know, we are missing opportunities to create policy that promotes genuine societal inclusion. This reinforces the importance of keeping researchers with a unique voice in the form of personal triangulation involved in research, policy and advocacy.

182 Perceptions of Clinicians on the Adaptation of a Guided Self-Help Online Intervention for Psychological Symptoms after Acquired Brain Injury

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ABSTRACT

Context: Cognitive, psychological, sleep, and fatigue issues are common and persistent consequences of acquired brain injury (ABI). While non-pharmacological interventions can be effective, they are not always accessible. Self-help online interventions offer a promising alternative but may not be suitable for all patient profiles. In the last few years, the RESILIENT platform was developed and tested as a blended intervention for psychological and sleep problems in the context of a traumatic event.

Objectives: This study aims to explore the perceptions of rehabilitation clinicians on the feasibility and usability of a self-help online intervention for the ABI population (RESILIENT) and to identify necessary adaptations.

Methods: A focus group was conducted with six clinicians (four neuropsychologists, one physiotherapist, one social worker, including two clinical coordinators) from the traumatic brain injury and encephalopathy programs of a university-affiliated rehabilitation center in Québec, QC, Canada. Clinicians reviewed the existing platform before the focus group, where they discussed the applicability of a self-help treatment with adults with ABI and the necessary adaptations to the content and format of the intervention. A thematic analysis was performed on the transcribed verbatim of the focus group.

Results: Clinicians generally liked the idea of an adapted platform for patients with ABI but had mixed opinions about fully autonomous self-administered treatment. Most viewed this intervention as a complement to rehabilitation services, requiring support from a trained support facilitator. Some saw RESILIENT as a way to fill service gaps, such as for patients on waiting lists, after discharge from rehabilitation, or living in rural areas. Barriers identified by participants included aphasia, apathy, hemineglect, hemianopsia, physical challenges with computer use, poor self-awareness, and lack of access to technology. To make the intervention suitable for individuals with ABI, clinicians suggested reducing and simplifying text, adding more images and examples, and incorporating rewards to foster motivation. They also recommended addressing additional topics, such as fatigue, substance use, behavior management, lifestyle habits, intimacy, and psychoeducation on ABI, as well as content for caregivers. C

Conclusion: While the RESILIENT online self-help platform shows therapeutic potential, it requires adaptations to better suit ABI patients. Future studies will assess the efficacy, feasibility, and acceptability of the adapted treatment.

183 Cluster C Personality Traits Predict Functional and Social Recovery Following Mild Traumatic Brain Injury

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ABSTRACT

Objectives: For many patients, mild traumatic brain injury (mTBI) leads to a cascade of adverse consequences that negatively impact the quality of life, including persistent post-concussive symptoms and long-term difficulties with functional and social reintegration. To mitigate these negative effects, research has focused on identifying factors that can help to rapidly target patients at risk of persistent consequences to promote appropriate management. Among these factors, personality traits have emerged as playing a potentially important role in recovery trajectories. However, the existing literature is sparse and focuses almost exclusively on post-concussion symptoms, to the detriment of functional and social reintegration. Nevertheless, given that these reintegration challenges can significantly reduce life satisfaction in post-mTBI patients, they must be addressed. Therefore, this study aimed to identify which personality traits from the Diagnostic and Statistical Manual of Mental Disorders—5 (DSM-5) Cluster C (avoidant, dependent and obsessive-compulsive) predict functional and social recovery between three- and six-months post-injury.

Methods: 65 symptomatic adults with mTBI were recruited between March 2020 and December 2021 at the Montreal General Hospital (MGH) Trauma Center outpatient mTBI clinic. Within the first month after mTBI, participants were asked to electronically complete a questionnaire assessing personality traits, the Millon Multiaxial Clinical Inventory, 3rd edition (MCMI-III). A follow-up telephone interview lasting approximately 15–20 minutes was conducted three and six months after the injury. During these semi-structured interviews, the quality of functional and social reintegration was assessed using the Mayo-Portland Adaptability Inventory, 4th edition (MPAI-4). The MPAI-4 is a questionnaire that measures three domains: ability, adaptation, and participation, to identify specific areas of difficulty. Recovery trajectories (favorable vs. unfavorable) were determined based on relative recovery scores derived from the MPAI-4 at both time points.

Results: Comparisons between participants who completed all questionnaires and those who withdrew revealed no significant differences in MPAI-4 total or subscale scores. Similarly, no significant differences were found in the DSM-5 avoidant, dependent, or obsessive-compulsive subscale scores. Binary logistic regressions established that the avoidant ($B = 0.031$, $p = 0.024$) and obsessive-compulsive ($B = 0.067$, $p = 0.031$) personality scales significantly predicted the recovery group for one of the three reintegration variables, namely adaptation. The higher the patient's score on the MCMI-III avoidant or obsessive-compulsive scale, the greater the chance of belonging to the unfavorable recovery group. No significant

differences were found between the favorable and unfavorable recovery groups regarding sociodemographic and injury-related variables.
Conclusions: These findings suggest that avoidant and obsessive-compulsive personality traits from DSM-5 Cluster C are most likely to contribute to persistent reintegration difficulties following a mTBI, particularly in the domain of adaptation. Early identification of these traits could help clinicians detect patients at risk for poor recovery outcomes, enabling more tailored and proactive management strategies.

184 Examining Treatment Protocol Adaptions in a Self-Regulation Intervention for Older Adults With and Without TBI

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ABSTRACT

Background: Falls are the leading cause of death and nonfatal injuries in adults 65 and older in the U.S. and a primary cause of traumatic brain injury (TBI). TBI often results in lasting cognitive deficits, such as memory, attention, and executive function issues. As TBI requires lifelong management, fall prevention must be adaptable to address the needs of those aging with TBI. Self-management strategies like mental contrasting with implementation intentions (MCII) have shown promise in promoting behavior change. MCII includes five manualized steps, including 1) goal identification, 2) goal relevancy, 3) barriers to goal, 4) strategies to overcome a barrier, and 5) creating a plan to complete the goal. While MCII is client-centered, its adaptability for fall prevention in clinical settings, particularly for older adults with TBI, remains underexplored. This study assessed the adaptations required for MCII in older adults with and without TBI, delivered by student clinicians.
Methods: Older adults aged 65 and above, with or without TBI, were recruited from the community. Participants had to be English-speaking and have no more than mild cognitive or language impairments. Those with TBI provided medical documentation. Ten first-year speech-language pathology Master's students and five senior undergraduates in speech-language pathology were trained to deliver the manualized MCII intervention. A mixed-method experimental design was employed, with data collected at two points: 1) during the MCII intervention and 2) at least three weeks after the intervention in a semi-structured interview. Both in-person and virtual formats were used. Outcome measures included treatment adaptations across the five MCII manualized steps and qualitative interview data from clinicians and participants.
Results: Forty-one older adults participated (TBI=19, no TBI=22). Participants with TBI required more intervention adaptations ($F(1)=6.8$, $p=.012$). Adaptions primarily occurred in the later stages of MCII (identifying barriers and strategies, and creating a plan). Adaptions were fidelity consistent with the MCII protocol and included increased repetition, examples, and cognitive support for planning and organizing. Clinicians rated MCII equally appropriate for people with and without TBI ($F(1)=.908$, $p=.345$). Still, they noted the need for flexibility in delivering MCII to participants with TBI for participants to be successful. Participants echoed this overall reflection of MCII as a strategy, with people with TBI finding the strategy helpful but requiring additional support and guidance to complete MCII.
Discussion: MCII shows potential as an adaptable tool for fall prevention in older adults, including those with TBI. While participants with TBI required more individualized support and modifications, both groups used the strategy to learn and execute fall prevention strategies. These results underscore the importance of tailoring interventions like MCII for older adults with TBI. Further research is needed to assess the broader applicability of these adaptations across diverse populations and clinical settings.

185 Developing a Data Visualization Tool for Adults with Disorders of Consciousness in a Specialized Rehabilitation Program

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ABSTRACT

Objective: The purpose of this study was to identify, compare, and contrast the informational needs of potential user groups to develop a data visualization tool that tracks progress in adults with acquired disorders of consciousness (DoC).
Background: Data visualization is the representation of information in a chart, diagram, picture, or other pictorial format. By definition, patients with DoC may not show consistent behavioral responses to stimuli or commands and cannot engage in basic self-care and mobility activities that are frequently targeted in rehabilitation interventions. Behavioral signs of consciousness are often difficult to detect and reflexive responses can be mistaken for purposeful actions. A dashboard showing key metrics that reflect current level of consciousness and track recovery trajectory in patients with DoC can aid prognostication inform treatment decisions, and enhance communication among clinicians, patients' families, and third-party payors.
Methods: We conducted a qualitative descriptive study informed by a learning health systems approach to understand the needs of rehabilitation therapists (n=2), family members of patients with DoC (n=2), and liaisons for third-party payors (n=3). A common set of guiding questions was used for all interviews to determine stakeholder preferences for clinical information. Analysis was descriptive and utilized a matrix

approach. In collaboration with the informatics team, we identified and extracted key data elements from the electronic health record to construct a prototype dashboard.

Results: All participants desired similar content for a dashboard; however, each user group needed different contextual information and had varying design preferences. Clinicians preferred to see all key assessment tools displayed longitudinally on a single screen to support clinical reasoning. Family members preferred simple, easy to understand displays with context for score interpretation (i.e., descriptors of DoC level). Payor liaisons prioritized visualizations that would provide context for prognosis, such as time elapsed since initial injury and normative recovery trajectories. The final design includes simple graphs of key metrics as well as "drill down" views with detail on specific assessment results.

Discussion: Data visualization has great potential to support communication and shared decision-making among different stakeholders about rehabilitation progress. An advantage of engaging multiple user groups early in the design process of a data visualization tool is that a variety of needs can be anticipated and addressed, thereby increasing the likelihood of adoption and satisfaction with the resulting tool. The iterative design process in which we are engaging multiple user groups aims to bridge these needs.

186 Analyzing Discourse in Aging with TBI: Comparing Conversational Discourse of Older Adults

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ABSTRACT

Background: Traumatic brain injury (TBI) is a leading cause of cognitive and communication impairments in older adults, affecting areas such as memory, attention, and executive function. These deficits often manifest in conversational discourse, where individuals may struggle with verbal fluency and maintaining coherence. While discourse analysis in aging adults, including those with neurodegenerative disease, is well-documented, less is known about how aging with TBI further influences discourse. Effective discourse is critical for maintaining social connections and quality of life in older adults, making it important to understand how TBI affects conversational abilities in this population. This study analyzed conversational discourse in older adults with and without TBI, focusing on differences in discourse variables: coherence, verbal fluency, mean-length utterance (MLU), and length to response time.

Methods: Participants included 52 older adults aged 65 and above (TBI=25, no TBI=27) recruited from the community. The TBI group had a history of mild-to-moderate TBI, confirmed through medical documentation. All participants were English-speaking and had no more than mild cognitive impairments, as assessed by standardized cognitive screening tools. Conversational discourse was elicited through medical conversational discourse, where participants engaged in back-and-forth discussions related to a healthcare conversation (fall prevention education). These conversations were recorded, transcribed, divided into c-units, and analyzed with Systematic Analysis of Language Transcripts (SALT). Coherence was assessed using topic maintenance, relevance, and logical flow measures. In contrast, mean length utterance and verbal fluency were measured by speech rate, pauses, word retrieval difficulty, and the number of fillers (e.g., "um," "uh"). Group differences were examined using ANOVA.

Results: There were no differences in verbal fluency ($F(1, 50) = 3.69$, $p=.076$) or length to response time ($F(1, 50) = 8.56$, $p=.082$) between older adults with and without TBI. There were significant differences in both coherence ($F(1, 50) = 15.45$, $p=.002$) and mean length utterance ($F(1, 50) = 13.43$, $p=.004$) were found between older adults with and without TBI. The TBI group demonstrated reduced coherence, with more frequent topic shifts, irrelevant statements, and difficulties maintaining a logical flow in conversation, which may also account for the longer utterance lengths. In contrast, participants without TBI demonstrated more coherence in discourse with shorter MLU than those with TBI.

Discussion: The findings suggest that older adults with TBI demonstrate increased differences in coherence and MLU compared to older adults without TBI. These impairments may result from differences in cognitive function, such as reduced executive functioning that older adults with TBI may experience as more pronounced than those aging without TBI. As such, additional support may be needed for older adults aging with TBI to maintain coherence in conversational discourse. Future research should explore the impact of these conversational implications on social participation and quality of life.

187 Visual Assessment Tools Used in Acute Sport-Related Concussion: A Review

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ABSTRACT

Background: Sports-related concussions pose significant diagnostic challenges. This condition can lead to various physical, emotional, and cognitive symptoms, including deficits in the visual system. Identifying and addressing these dysfunctions promptly after concussion is crucial to ensure safe return to play. The visual system being heavily involved in sports, it is essential to highlight the tools used for its assessment, thereby equipping healthcare professionals effectively.

Objective: The main purpose of this study is to expose, through a systematic review, visual assessment tools available in the literature used in the context of acute sport-related concussion evaluation.

Methods: This review was registered in PROSPERO on December 14, 2023 (CRD42023487769). Documents were identified from the Medline, CINAHL, SportDiscus, and

Academic Search Complete databases. To be included, peer-reviewed articles had to (1) be written in English or French, (2) be published between 2009 and 2023, (3) take place in a sports context, (4) involve adult and/or pediatric athletic populations, and (5) assess the visual system (completely or partially) within 0 to 7 days after a sport-related concussion. Document selection occurred on Covidence platform, and risk of bias assessments were conducted using Joanna Briggs Institute quality assessment tools. These steps were completed by three distinct reviewers.

Results: Eighteen articles were included in this review, involving a total of 7,702 athletes with a mean age of 19.2 years old. A variety of amateur to elite sports were represented. Among these, 2,574 sport-related concussions were assessed using five distinct visual assessment instruments: Vestibular/Ocular Motor Screening (VOMS) (n=12), King-Devick (n=4), King-Devick combined with eye tracking (n=1), Monocular Eye Tracking System (n=1), and Mobile Universal Lexicon Evaluation System (MULES) (n=1). Overall, assessments using these tests indicated worsening scores following acute sport-related concussions. VOMS, the most studied tool in this review, demonstrates great sensitivity and specificity for diagnosing concussions and the potential to predict a longer recovery when lower scores are observed.

Conclusions: This review is limited by the small sample size for other tools than VOMS. Additionally, the evidence level of the included articles was somewhat low. In summary, this review contributes to advancing the scientific understanding of the available tools for assessing the visual system in the context of post-concussion visual dysfunction in sports.

189 "It's Profound": Using an Online Training Program and a Peer-Moderated Private Facebook Group to Support Safe Use of Social Media for Connection after Brain Injury

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ABSTRACT

Background: Social media can be challenging for people with an acquired brain injury (ABI) to use meaningfully and safely. A pilot study presented at the IBIA World Congress in 2023 found the multicomponent social-ABI-lity intervention to be feasible and acceptable, and participants reported improvements in confidence and enjoyment using a clinician-moderated Facebook group for social connection. However, given the potential benefits of peer-moderated interventions, we wanted to explore the feasibility and acceptability of the intervention when facilitated by peer moderators. This study evaluated the outcomes of conducting the multi-component intervention with a peer-moderated Facebook group, from the perspectives of both the participants and the peer moderators.

Methods: A mixed-methods, pre-post intervention design was used. Two people with ABI joined the research study as co-investigators and peer-moderators. Peer moderators completed a 2-hour training session, and roles and responsibilities were discussed and negotiated with other members of the research team prior to commencing the Facebook group. Participants completed the self-guided social-media course (social-ABI-lity), and then were encouraged to engage in the private, peer-moderated Facebook group over an 8-week period. Data were collected through observation of Facebook group activity, weekly surveys, and a post-intervention interview. Data were also collected on social media use and quality of life at pre-intervention, post-intervention, and 3 months post-intervention. Descriptive analysis was conducted for participant characteristics, social media use, social media knowledge, and social media engagement. Statistical analysis was used to compare measures for quality of life and reported ratings of frequency, confidence, and enjoyability of Facebook use. Thematic analysis was conducted on interview data, using an iterative process that incorporated an auto-ethnographic approach.

Results: Seven adults with an ABI completed the 8-week intervention, reporting improved confidence and enjoyment in using Facebook. The intervention was found to be acceptable, engaging, and feasible. Although there were no significant changes in quality of life, participants reported multiple benefits from the intervention. Our thematic analysis generated eight themes: loss, isolation, return, confidence, choice, identity, connection to community, and the 'peer' effect. Peer moderators observed that participants felt safe and supported by others with lived experience, which meant they felt more comfortable taking risks, making mistakes, and 'putting themselves out there'. This reinforced sense of belonging encouraged everyone to take social risks, knowing that there was a safety net of understanding and empathy. Being involved also had a positive influence on the confidence and sense of self-identity of peer moderators.

Conclusion: This multicomponent social-ABI-lity intervention was the first of its kind. New insights relating to the peer-moderated group component of this subsequent pilot study will be discussed and contrasted with those of the clinician-led pilot study. Future implementation studies are warranted to determine usefulness and sustainability of this intervention in clinical practice.

190 social-ABI-lity: Development of a social media and online communication assessment tool for people with acquired brain injury (ABI)

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ABSTRACT

Background: People with acquired brain injury (ABI) can experience social isolation and loneliness which can negatively affect their mental health and quality of life. While social

media provides a multitude of opportunities for social participation and meaningful connection, its use after an ABI can have increased risk of negative experiences (e.g., trolling, scams). Due to changes in their cognition and communication skills, people with an ABI can also find it challenging to use social media. Rehabilitation clinicians often take a reactive approach to addressing challenges and navigating problematic online communications and currently have limited resources available to assess online communication skills or identify goals for rehabilitation. To address this gap, this study aimed to collaboratively develop a social media and online communication assessment tool to guide and support clinicians and people with brain injury to target social media goals and use during rehabilitation.

Methods: This mixed methods modified Delphi process used focus groups and online surveys, and was co-designed with a large interdisciplinary team, inclusive of people with an ABI.

Results: Twenty-two stakeholders (professionals working with people with ABI n=13, people with ABI n=8, and friends or family of a person with ABI n=1) participated by sharing their perspectives on the content and format that should be included in a social media assessment tool during seven focus groups and via email. Content analysis of focus group and email response data was used to develop the first iteration of the social media assessment tool. Content was grouped into five categories of meaning generated in previous research in the field: Support, Knowledge and Experience, Purpose, Caution, and Networks. In terms of format, a mix of rating scales, short-answer questions, and practical tasks were preferred. A Qualtrics survey was used to determine consensus, whereby sixteen stakeholders provided quantitative and qualitative feedback on the content and format of the first iteration of the assessment tool. Ninety-nine percent of the questions achieved >80% consensus. Subsequent iterations have focused on refining the content and format of the assessment tool based on consensus ratings and the qualitative feedback provided. It was anticipated there would be three rounds of surveys in the modified Delphi process, to be concluded in 2024. Our presentation will discuss the iterative process of development, inclusive of presentation of the agreed upon assessment tool items.

Conclusion: This social-ABI-lity assessment tool for social media and online communication skills after ABI is the first of its kind and provides critical evidence-based guidance to enable clinicians to proactively support people during rehabilitation to build their social media skills for communication and social participation. Future implementation studies are planned to determine construct validity and usefulness of the tool in clinical practice.

191 Stay Tuned: Exploratory Content and Thematic Analysis of Traumatic Brain Injury Content on YouTube and Instagram

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ABSTRACT

Background: People with a traumatic brain injury (TBI) can experience social isolation and loneliness due to changes in their cognitive-communication. Due to these cognitive-communication changes, people with a TBI can also find it challenging to use social media. However, social media platforms can offer vital opportunities for social participation after TBI. Research exploring TBI representation on Twitter (now known as X) identified that people with TBI used the platform for making and maintaining relationships, with many sharing their experiences and strategies following brain injury, as well as for activism and altruism. However, the use of Twitter/X and other social media platforms differs greatly. Research was warranted to understand content posted on different platforms to provide health professionals with a greater understanding of the benefits and risks of social media use for people after TBI and inform interventions that incorporate these platforms.

Methods: Two studies using mixed methods were conducted to explore content shared on YouTube and Instagram. A sample of 100 posts that included the term 'brain injury' were collected from YouTube and from Instagram. Content analysis was applied to all 200 posts to categorise the content. From each category, representative posts were selected to be analysed in more depth, using visual data analysis to develop narratives which were then analysed thematically.

Results: The sample of 100 YouTube videos contained educational, lived experience, and promotional videos. The sample of 100 Instagram posts yielded these same three categories with an additional category of motivational posts. An overarching theme of 'Video tells a story' was generated from detailed analysis of eighteen YouTube videos, with three major subthemes: we choose how the story is told, recovery is a process, and it changed my life. Detailed analysis of nine Instagram posts generated four themes: sharing their stories, navigating challenge, anticipating more, and building community. Our presentation will provide an overview of findings, clinical implications, and our recommendations for healthcare professionals who may wish to use these two platforms for public awareness and advocacy.

Conclusion: Community groups and people with TBI used YouTube and Instagram to facilitate social connections and

exchange stories. These platforms provided a space for supportive and positive communities, suggesting integration of their use in TBI rehabilitation may be beneficial for reducing social isolation. This research provides critical evidence-based guidance for rehabilitation to build social media skills for communication and social participation after TBI, as well as for the use of these two platforms for health communication and advocacy. Future research is warranted to explore other social media platforms, and to trial the use of the recommendations identified in supporting people with TBI to share their stories and for generating online communication materials to build engagement and address misinformation about TBI.

192 Building a CIRCLE: Creation of a sustainable, meaningful, and productive international cognitive-communication disorders research think tank

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ABSTRACT

Background: Cognitive-communication disorders (CCDs) can have a devastating effect on people's lives after acquired brain injury (ABI), as well as those around them. In comparison with other specialised areas of speech-language pathology (SLP), such as post-stroke aphasia, research in CCDs after ABI is relatively new. Globally, researchers interested in supporting people with CCDs after ABI is small, yet highly motivated, and from diverse geographical regions. It is rare yet special when global mid-career researcher colleagues meet in-person and have 'corridor' conversations that explore specific and forward-thinking research ideas and threads. These conversations between researchers lead to idea generation, collaborations, knowledge sharing, and have the potential to progress the field of cognitive-communication rehabilitation. Because frequent interactions can foster ongoing international collaboration and advance the empirical evidence base for CCDs, this presentation reports on the conceptualisation and development of an international group of CCD mid-career researchers with this aim.

Methods: Following an international conference, a collaboration of international, mid-career researchers participated in regular conversations via video-teleconferencing. Meetings were held monthly during 2024, with those able to attend joining the online conversation, and those unable to attend contributing to brainstorming ideas via email and online software.

Results: The group has diverse expertise across the lifespan, including qualitative and mixed methods approaches. Specialist interest areas include: accurate assessment, discourse methods, visual elicitation materials, communication partner training, interpersonal relationships, project-based interventions, social media, digital health tools, return to school, military and veterans' health research, interventions for dementia and caregiver training, educational impacts, patient-provider communication, communication across modalities, empathy training, and participatory co-design. The team, self-named CIRCLE (Cognitive-Communication Researchers Linked for Excellence), are highly invested in research projects that prioritise cross-cultural perspectives, meaningful rehabilitation options, and are co-designed with people with ABI from the outset to amplify their voices and incorporate their perspectives and expertise. Brainstorming has generated short-term goals for the group including collaborations on small projects and building international grant proposals. Long-term goals include building awareness of CCDs internationally, including potential for a shareable 'textbook' for clinicians, e.g., short videos of key information for social media. Our presentation will explore our ideas and invite discussion around the group's goals for the future, including dissemination and implementation as well as modelling through participatory co-design.

Conclusion: This international research collaboration represents the next generation of researchers striving to create meaningful and significant contributions to the field of CCDs after ABI. Diverse experiences across countries, healthcare systems and areas of expertise can allow for innovative problem-solving in ABI. Our presentation will highlight how finding your CIRCLE may provide sustainable practices for international collaborations and build critical evidence-based guidance for ABI rehabilitation, as well as for successful health communication and advocacy in this space.

193 Predicting Duration of Post Traumatic Amnesia [PTA] After Admission to Inpatient Rehabilitation Following Moderate to Severe Traumatic Brain Injury [msTBI]

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ABSTRACT

Objectives: To develop a predictive model of time from rehabilitation admission to emergence from PTA.

Background: The hallmark of msTBI is a prolonged period of retrograde and anterograde amnesia often coupled with behavioral disturbances termed Post-Traumatic Amnesia [PTA]. Patients in PTA have difficulty with orientation, day to day memory, safety awareness and carry over of treatment paradigms. Patients with ongoing PTA are very difficult to discharge back into their community safely given their

supervision needs. Additionally, it is known that duration of PTA following injury is the best indicator of injury severity and long- term resource utilization.
Methods: Of 439 TBI patients admitted to the rehabilitation center 201 were still in PTA upon admission. The primary outcome was time from rehabilitation admission to emergence from PTA in the rehabilitation center as determined by an Orientation-Log [OLOG] score ≥ 25 on two consecutive days administered by unit-based Speech and Language Pathologist. Demographic variables, injury type, duration of PTA at rehabilitation center admission, and intake 'Self Care' and 'Motor' scores on the Centers for Medicare and Medicaid Services [CMS] Care Tool were considered in relation to time from rehabilitation admission to emergence from PTA. Multivariable Cox regression modeling of time to clear PTA included a complex interaction term of the Care Tool scores and PTA duration measured at admission generated from recursive partitioning investigation using classification and regression trees [CART] methodology.
Results: CART analysis generated the categorization of Care Tool scores and duration of PTA into four groups that most significantly discriminate the probability of emergence from PTA. In patients with a 'Self Care' score > 17, 50% will clear their PTA in the first seven days of rehabilitation. For patients with 'Self Care' score < 17 and who had more than 45 days in PTA upon admission to rehabilitation, 58% clear PTA after 42 days.
Conclusions: Care Tool 'Self Care' Scores and PTA duration upon admission to a rehabilitation unit have a strong prognostic value for estimating time until PTA clearance during rehabilitation. Total duration of PTA is a central aspect of moderate to severe TBI both in terms of assessing injury severity and describing prognosis but also in planning a rehabilitation approach to the patient and their injury. Accurately estimating duration of PTA can help the clinician establish an acute rehabilitation plan and allow them to counsel the patient and family about likely outcomes.

194 Exploring Sex Differences in Psychological Readiness to Return to Sport Following Sport-Related Concussion in Division I College Athletes

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ABSTRACT

Introduction: Psychological readiness to return to sport (RTS) refers to an athlete's mental and emotional preparedness to confidently resume sport participation following injury. However, it remains unclear if there are sex differences in psychological readiness to RTS among concussed collegiate student-athletes and if this changes throughout concussion recovery.
Purpose: To investigate sex-based differences in psychological readiness to RTS among collegiate student-athletes within 5 days of sustaining a concussion (Initial visit) and at time of RTS visit.
Methods: Collegiate student-athletes were administered the Injury-Psychological Readiness to Return to Sport (I-PRRS) Scale at Initial and RTS Visits. Higher total scores for the I-PRRS (22 items summed; Likert scale 0 (low confidence) to 100 (high confidence)) are associated with greater confidence for RTS. A 2 sex (male, female) x 2 time (Initial, RTS) analysis of variance (ANOVA) was conducted to determine differences on I-PRRS scores ($p < .05$).
Results: Approximately 32 Division I student-athletes (Female= 16, age= 20.35 ± 1.68yrs) who sustained a concussion were included in this exploratory study. Results revealed a significant effect of time ($F(1, 31) = 40.04$, $p < .001$), with scores improving from Initial Visit (M = 73.84) to RTS (M = 95.20). There was no significant effect of sex ($F(1, 31) = 3.09$, $p = .089$) for male (M = 87.64 ± 18.63) and female (M = 80.78 ± 18.01) concussed student-athletes. Additionally, there was no significant interaction between time and sex ($F(1, 31) = 1.53$, $p = .225$), indicating that the improvement in scores over time was similar for both sexes.
Conclusion: In conclusion, the results indicate a significant improvement in psychological readiness from the Initial Visit to the RTS assessment, highlighting the positive trajectory of recovery among concussed collegiate student-athletes. However, the lack of significant effects related to sex suggests that both male and female student-athletes experience similar levels of psychological readiness as they progress through concussion recovery. These findings underscore the importance of considering time as a critical factor in rehabilitation, while also indicating that interventions could be equally effective for all sexes. Further research should examine additional variables that could influence psychological readiness to RTS.

195 Predictors of Treatment Response in Functional Cognitive Disorder after Concussion

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ABSTRACT

Introduction: Concussion may be a common precipitant of functional cognitive disorder (FCD). FCD is characterized by persistent, distressing cognitive symptoms not fully explained by structural brain injury. While some treatment options for FCD after concussion have been explored, there is limited research on patient characteristics associated with treatment response in this population. The current study explores potential predictors of treatment outcome.

Methods: Secondary analyses were conducted using data from a recent pilot clinical trial (ClinicalTrials.gov ID: NCT05581810) that randomized participants with FCD after concussion to cognitive behavioural therapy (n=11) or cognitive rehabilitation (n=13). The sample consisted of adults with a multidisciplinary consensus diagnosis of FCD [19 women, mean age=41.0 years (SD=12.6), mean time since concussion=17.1 (SD=4.9) months]. We predicted that lower depressive symptoms (Patient Health Questionnaire-9; PHQ-9), higher treatment expectancy (Credibility/Expectancy Questionnaire - Expectancy subscale), greater resilience (Connor-Davidson Resilience Scale), and higher FCD severity (based on number of internal inconsistencies) at baseline would predict better treatment outcome. The primary outcome was the Multifactorial Memory Questionnaire-Satisfaction subscale (MMQ-S; lower scores indicated greater memory concern). Multivariable regression models for each candidate predictor were conducted using the combined sample (N=24), as we previously found no differences between the treatment arms. In all models, pre-treatment MMQ-S scores were included as a covariate and post-treatment MMQ-S scores as the dependent variable. In supplemental analyses, we compared treatment outcomes in participants with high vs. low pre-treatment scores and explored treatment process variables as secondary outcomes.

Results: Depression had a medium effect on post-treatment MMQ-S scores (standardized β=-0.43, 95% CI [-1.00, 0.15]) and, together with pre-treatment MMQ-S scores, explained 13.8% of the variance in post-treatment MMQ-S scores. Participants with high pre-treatment depression symptoms (PHQ-9 ≥ 10; n = 12) had MMQ-S post-treatment scores that were 5.6 points lower (95% CI [-3.02, 14.28], standardized mean difference = 0.66) than the non-depressed group, controlling for pre-treatment MMQ-S scores. Higher pre-treatment PHQ-9 scores were associated with lower homework adherence (r=-0.26, 95% CI [-0.61, 0.18]) and more no-shows (r=0.43, 95% CI [0.03, 0.71]). Treatment expectancy (standardized β=0.01, 95% CI [-0.45, 0.47]), resilience (standardized β=0.09, 95% CI [-0.36, 0.54]), and FCD severity (standardized β=0.05, 95% CI [-0.46, 0.56]) were not associated with MMQ-S post-treatment scores.

Conclusion: Depressive symptoms may interfere with treatment engagement and hinder outcomes. Treatment expectancy, resilience, and FCD severity were not associated with response to treatment in this small sample. A large proportion of variance in treatment outcomes was unexplained by measured baseline variables, suggesting that other factors, such as therapist- and treatment-specific variables, should be explored in future research.

196 Speech-Language Pathologists' Views on Visual Discourse Elicitation Materials for Cognitive Communication Disorder after TBI

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ABSTRACT

Background: Spoken discourse (e.g. conversations, telling anecdotes, retelling events) is commonly affected after traumatic brain injury (TBI). Discourse post-TBI may be less organized, lack cohesion and coherence, and provide too much or too little information. International guidelines recommend assessing and treating discourse post injury. In research literature, different discourse stimulus tasks have been used with cognitive communication disorder after TBI. Clinically, SLPs assess and treat discourse as part TBI communication management, using materials aligned with those used in research studies (Steel et al., 2024). However, SLPs' perceptions on the suitability of these materials have not been formally investigated. This study aimed to explore the views of Australian SLPs on available visual discourse elicitation stimuli, the clinical utility and acceptability of these tasks, and alignment with materials reported in research studies.

Methods: This mixed methods research reports on a survey of Australian SLPs working with adults with cognitive communication disorder post TBI. In multiple choice and free text questions, SLPs were asked about their use of existing stimuli, preferences around visual imagery, client engagement with visuals, and their suggestions for future stimuli development. Responses were analysed using descriptive statistics and qualitative content analysis.

Results: A total of 34 SLPs responded, with 17 completed surveys. All participants reported routine use of a variety of discourse genres including narratives or picture description tasks, elicited using a range of tasks and materials (e.g., single picture, picture sequence, and story retelling). Participants identified the Cookie Theft (BDAE) as their most frequently used elicitation stimulus, followed by the Flowerpot Incident and the Picnic Scene (WAB). Reasons for use included SLP familiarity with task, ability to generate sample of sufficient length and complexity, and accessibility. No strong preferences for any visual materials were reported in this survey; however, overall, participants reported the existing visual materials were unsatisfactory for reasons including: client's visual abilities, interests, age-group, and severity of injury. SLPs ranked their top features for inclusion in novel discourse elicitation task development. Age appropriateness and increased range of elicitation options were equally ranked first, followed by up-to-date images and personally relevant materials, and digital video options. Priorities for development also included standardised scoring systems and non-transcription-based approaches (e.g., checklists). Insights into SLPs' clinical reasoning for discourse management post-TBI will be discussed.

Conclusions: This exploratory study provided insight into Australian SLPs' views on the visual elicitation stimuli for

discourse post-TBI. When selecting visual resources, participants emphasised the need for an individualised, client-centred approach that considers visual abilities, clients' interests, age group, and injury severity. The current findings contribute to limited knowledge of stakeholder views on elicitation tasks and will inform future research on discourse resource development after TBI.

197 The Path to Independence: The Transformative Power of Goal-Oriented Rehabilitation in Rebuilding Quality of Life after Brain Injury

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ABSTRACT

Introduction: Goal setting is essential in rehabilitation after an acquired brain injury (ABI), as it encourages active involvement in recovery. At Center Naprej (CN), a goal-oriented rehabilitation approach allows users to personalize their recovery by setting goals in areas such as health, work, emotions, and social relationships. This individualized focus increases motivation and commitment, leading to better physical functioning and overall quality of life (QoL). Research shows that goal-oriented rehabilitation contributes to greater independence, improved functionality, and better emotional and social well-being—critical for long-term recovery success (Siegert&Taylor, 2004; Wade, 2009; Von Steinbuechel et al., 2010).

Objectives: To analyse the importance of goal setting in long-term rehabilitation and examine the relationship between goal achievement and QoL after ABI.

Methods: The study consisted of two parts. The first part (2019–2023) analysed the significance of goal setting using a two-level goal taxonomy linked to the "Wheel of Life" tool, where users assessed 10 life areas. General goals (first-order) and specific goals (second-order) were categorized and analysed. In the second part (2023-2024), the study expanded to explore the connection between goal achievement and quality of life after ABI. Participants: The first part: 62 users from CN (15 women, 47 men, M-age=54.87). The second part: 47 users (12 women, 35 men, M-age=55). Measurements: Quality of Life after Brain Injury - QOLIBRI; Self-evaluation of Rehabilitation Goal Achievement (CN, 2019).

Results: We examined 253 general and 1,122 specific goals. Users most frequently set goals in the areas of Knowledge/Work (36% of general and 35% of specific goals) and Health (28% of general and 46% of specific goals). Results showed that 48% of general goals improved in evaluations over the years, with the average evaluation increasing from 5.49 in 2019 to 6.66 in 2023 for general goals, and from 5.18 to 6.75 for specific goals. Additionally, 33% of general and 27% of specific goals were consecutively evaluated for five years, indicating long-term goal pursuit. In the second part, a positive trend was found between goal achievement and QoL, though the correlation was not statistically significant (p=0.058), but there was a medium effect size (η2=0.083).

Conclusions: The study showed that goal achievement in long-term rehabilitation plays a role in QoL after ABI. Users at CN mainly set goals related to Knowledge/Work and Health, reflecting a desire to restore functionality and well-being. The pursuit of long-term goals suggests that commitment to these goals is essential for successful rehabilitation. Although the correlation between goal achievement and QoL was not statistically significant, we´ve got a medium effect size. The trend indicates that higher goal achievement is associated with better QoL. This highlights the importance of setting realistic, achievable goals that provide a sense of progress and success in the rehabilitation process.

198 User Experience of a Virtual Reality System for Ecologically-Valid, Combined Motor and Cognitive Rehabilitation After Acquired Brain Injury

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ABSTRACT

Introduction: Motor deficits such as balance, mobility, and upper limb impairments are frequently observed after Acquired Brain Injury (ABI). Virtual reality (VR) can potentially overcome challenges associated with conventional rehabilitation by providing personalized, feedback-enhanced, and goal-oriented exercises. However, the execution of daily tasks requires motor and cognitive skills which often differ from typical virtual settings. We have developed a non-immersive VR system that incorporates real photographs of living spaces, allowing including interactive elements within various game scenarios which require participants to identify or position items using motor and cognitive functions. This study aimed to evaluate usability, presence, flow, competence, utility, and pleasant and unpleasant sensations of this VR system in ABI survivors.

Methods: 30 individuals with ABI (15 with traumatic brain injury and 15 with stroke) participated in this study. Participants (43.4% were female) had an average age of 55.8 years (SD=15.5) and a mean time post-injury of 30.1 months (SD=59.3). Each participant engaged with three different exercises, each lasting 4 minutes, with a 2-minute rest between exercises. Following the interaction, participants completed the System Usability Scale, the Flow State Scale 2, the Slater-Usoh-Steed Questionnaire, the Game Experience Questionnaire, and the Intrinsic Motivation Inventory.

Results: Participants found the system to be highly usable, rating it 81.4±10.4 over 100. They felt it provided clear goals (7.8±0.9 over 9) and unambiguous feedback (7.7±1.1 over 9).

Additionally, participants experienced a strong sense of presence (4.9±1.9 over 7). In terms of flow, participants reported experiencing this state (2.7±0.7 over 4), with action-awareness merging (6.3±1.4 over 9), time transformation (4.3±2.5 over 9), focused concentration on the task (8.0±1.1 out of 9), and a loss of self-consciousness (7.5±2.1 over 9). Regarding competence, ability, and control, they perceived themselves as competent (2.8±0.7 over 4 and 4.8±0.8 over 7), sensed a balanced challenge-skill ratio (7.2±1.2 over 9), and felt in control (7.4±1.5 over 9). Participants also reported positive sensations such as interest and enjoyment (5.2±0.7 over 7), autotelic experiences (7.0±1.7 over 9), immersion (3.1±0.9 over 4), and positive affect (3.2±0.8 over 4). In contrast, they reported low levels of pressure (3.1±1.0 over 7), tension (0.2 ±0.3 over 4), negative affect (0.3±0.5 over 4), and challenge (1.0 ±0.8 over 4). Lastly, they considered the system useful (5.1±1.1 over 7).

Conclusions: The gamified, VR-based exercises in realistic environments were found to be both usable and effective in promoting a strong sense of presence and flow. Participants felt capable, in control, and experienced positive sensations without negative emotions. They also saw the system as a valuable tool for rehabilitation.

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199 Electrical Brain Responses to Customized Emotional Stimuli As Indicators Of Emotional Processing In Healthy Individuals And Patients With Disorders Of Consciousness

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ABSTRACT

Introduction: Severe acquired brain injuries can result in disorders of consciousness (DOC) like unresponsive wakefulness syndrome (UWS) and minimally conscious state (MCS), where patients show limited responses to stimuli. Bedside neurobehavioral assessments often lead to misdiagnosis, prompting the use of multimodal methods like electroencephalography (EEG) for better accuracy. Research in healthy individuals links EEG features with emotion recognition during audiovisual stimulation. However, studies on DOC patients are limited. Some evidence suggests that personalized stimuli, like a patient's name or familiar voices, can trigger identifiable responses. This study explores differences in EEG responses of healthy individuals, patients in MCS, and patients with UWS when exposed to emotionally-valenced videos featuring relatives or strangers.

Methods: A convenience sample of 17 healthy subjects, 7 patients in MCS, and 10 patients with UWS was recruited. The experimental design included one-minute baseline period, followed by 12 randomized 55-second video clips (six featuring relatives, six featuring strangers), each followed by a 50-second rest period. Videos, including audio, were presented using the HTC Vive Pro Eye 2 virtual reality headset. EEG was recorded using a 32-channel Brain Products LiveAmp amplifier. Standard preprocessing techniques were applied, and the signals were segmented into 5-second windows. Common spatial patterns (CSP) were extracted for different frequency bands and a Support Vector Machine (SVM) was trained using these data to classify the two types of stimuli for each subject. A correlation analysis was also conducted to explore the relationship between patient scores on the Coma Recovery Scale-Revised (CRS-R) and the accuracy of their trained classifiers.

Results: In healthy subjects and patients with DOC, the SVM models trained using the gamma and high-gamma frequency bands achieved the best performance. The average classification accuracy in distinguishing between videos of relatives and strangers aligned with the clinical condition, with healthy subjects achieving an accuracy of 0.79, patients in MCS scoring 0.62, and patients with UWS reaching 0.51. More importantly, the trained models successfully classified both stimuli for all healthy subjects, and for 4 out of the 17 patients with DOC (UWS=1, MCS=3). Interestingly, 3 of them (all in MCS) emerged from MCS 6 months after. There was a strong correlation (r=0.78) between the CRS-R scores of patients and the classification accuracy of their EEG signals.

Conclusion: These findings suggest that EEG-based machine learning models may be effective in detecting responses to emotional stimuli and could offer valuable insights into the emotional processing abilities, which can improve the assessment of the level of consciousness and even detect covert cognition, in patients with DOC.

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200 Reliability and Validity of a Low-Cost Touchscreen-Based Kinematic Assessment for Evaluating Upper Limb Function in Stroke Patients

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ABSTRACT

Introduction: Conventional clinical instruments for evaluating upper limb motor function may have a limited ability to detect subtle motor changes, which can be crucial for tracking recovery progress. These traditional tools may also introduce

subjectivity, which can potentially alter the results. In contrast, kinematic assessments provide detailed, objective measurements of movement quality and quantity, which can complement conventional instruments and improve the evaluation of motor function. However, such assessments typically require expensive, complex equipment and time-consuming procedures, making them less practical for widespread clinical use. This study explores the potential of a cost-effective, touchscreen-based kinematic assessment tool to overcome these limitations by examining its reliability and validity in assessing upper limb function in post-stroke individuals. The goal is to offer a more accessible, accurate method for clinicians to track motor recovery.

Methods: In this study, sixty-four post-stroke patients were recruited. Each participant performed a visually guided reaching task on a large touchscreen, embedded in a conventional table. The task involved reaching from a central target to five peripheral targets arranged in a circular pattern, one at a time, and returning to the central target after each reach. To assess motor function, participants completed the Fugl-Meyer Assessment for Upper Extremity, the Box and Block Test, and the Nine Hole Peg Test. Kinematic measures of the movement trajectories recorded during the touchscreen task were analysed to assess both the reliability of the tool and its convergent validity by comparing it with the clinical instruments.

Results: The kinematic measures demonstrated strong test-retest reliability, with intraclass correlation coefficients showing moderate to excellent consistency across repeated measures. Convergent validity analyses revealed several significant correlations between the kinematic parameters and clinical assessments, particularly in tasks requiring higher levels of motor skill and precision. Notably, strong correlations were observed between the kinematic data and the Coordination and Speed subscale of the Fugl-Meyer Assessment for Upper Extremity, as well as the Nine Hole Peg Test, which highlight the sensitivity of the kinematic assessment in capturing fine motor control and functional performance.

Conclusions: The touchscreen-based kinematic assessment proved to be a cost-effective, reliable, valid, and sensitive tool for evaluating upper limb motor function in stroke survivors. Its ability to provide detailed, objective insights into movement quality could potentially enhance conventional clinical assessments. Furthermore, the affordability, ease of use, and fast operation of the instrument could facilitate its widespread clinical adoption, offering a scalable approach to better monitor and track motor recovery in stroke patients.

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201 Long-Term Functional Independence of Patients Who Emerge From The Minimally Conscious State

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ABSTRACT

Introduction: Some patients who survive severe brain injuries may develop disorders of consciousness (DoC), such as unresponsive wakefulness syndrome (UWS) and minimally conscious state (MCS). UWS is characterized by signs of arousal without self or environmental awareness, while MCS involves both arousal and awareness, demonstrated by non-reflexive behaviors or preserved language. Patients are considered to have emerged from MCS if they regain functional communication or object use. Although research on DoC diagnosis and prognosis is expanding, long-term clinical progress in patients emerging from MCS is less frequently studied, likely due to limited data. Yet, understanding the functional independence these patients can achieve is crucial for setting realistic expectations and improving care planning, resource allocation, and decision-making. Existing studies tend to be limited by small sample sizes, a focus on late recovery, specific etiologies, or the use of non-standardized or general measures. The aim of this study is to assess and describe the functional independence of patients who have emerged from MCS at six and twelve months post-emergence, overcoming the previous limitations.

Methods: The demographic and behavioral data of 267 patients with DOC, who were admitted to a long-term neurorehabilitation unit either in a state of UWS (n=125) or MCS (n=142), were retrospectively analyzed. The functional independence of those patients who emerged from MCS was evaluated at 6 and 12 months post-emergence using the Disability Rating Scale (DRS), the Barthel Index (BI), and the Functional Independence Measure+Functional Assessment Measure (FIM+FAM).

Results: 82 out of the 267 patients successfully emerged from MCS. Information of the functional independence was available for 75 patients at 6 months post-emergence and 57 patients at 12 months.

Six months after emergence, patients had mean DRS scores of 14.8±5.5, BI scores of 21.6±28.6, and FIM+FAM scores of 38.4 ±26.1. One year after emergence, patients had mean DRS scores of 13.1±6.1, BI scores of 34.1±32.8, and FIM+FAM scores of 47.0±29.0. Significant differences were found

between the admission and 6 months post-emergence in the DRS; and between 6 and 12 months post-emergence in the DRS, BI, and FIM+FAM. Most patients required total or maximal assistance (> 6 hours of daily assistance) at 6 months (81.1 %) and 12 post-emergence (63.4 %).
Conclusions: Although certain improvement in functional independence can be expected after the emergence of MCS, the great majority of the patients are likely to have a very limited functional independence and require total or almost total assistance one year after emergence.
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202 Evaluation of the Relationship Between Long-Term Memory Complaints and Metacognition Following Mild Traumatic Brain Injury (mTBI): A Study Protocol

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ABSTRACT

Introduction: A substantial number of individuals report persistent memory difficulties following mild traumatic brain injury (mTBI), often affecting their quality of life. However, the pathogenesis underlying the persistence of these complaints remains controversial, making it difficult to establish tailored interventions for patients in need. Indeed, while it is recognized that neurobiological and psychological factors interact with objective memory difficulties, the exact nature of this interaction is still unclear (Hayes et al., 2016). Given that some researchers suggest that patients may develop a more negative perception of their memory after a head trauma, exploring the role of metacognitive change in the maintenance of memory complaints could help clarify this interaction (Kit et al., 2007).
Objectives: This longitudinal study will examine the effect of brain lesions (e.g. microlesions), objective memory difficulties, psychological factors on memory complaints, by exploring metacognition as a potential mediator in their long-term persistence.
Methods: Three matched groups of participants (n = 60 per group) will be recruited: mTBI, orthopedic injury (without TBI), and healthy controls. Participants will be assessed at two time points: the first during the acute phase (T1, within three months of the accident for both mTBI and orthopaedic groups) and the second approximately eight months later (T2 ; i.e., one year after the accident). Memory complaints will be measured through the Multifactorial Memory Questionnaire and the Autobiographical Recollection Test, while episodic memory will be assessed using a task based on the Experience Sampling Method (ESM). In this method, participants use a smartphone app to complete short questionnaires about their activities over the course of a week. Five of these recorded events will then be used to create a personalized memory task in which participants will be asked to describe these events in detail, allowing for an assessment of the richness and accuracy of their recalls. This task will also be used to explore metacognitive accuracy confidence judgments associated with event memories. A metacognitive accuracy change score between T1 and T2 will be calculated. Psychological factors such as catastrophic thinking, avoidance, endurance behaviors, depression, anxiety and PTSD will be assessed through different questionnaires. Finally, to examine brain damage, mTBI and control participants will undergo 7 Tesla fMRI scans. To investigate whether metacognitive changes occur after mTBI, general linear models will be run on metacognitive accuracy change scores with group as independent variable. Scores for which an effect of mTBI is observed will then be entered into mixed-effects model analyses with these different factors to determine their influences on long-term memory complaints. By shedding light on the relative importance of different factors that contribute to the persistence of long-term memory complaints, this study could help to develop more tailored interventions.

203 NeMoRe: Neurofeedback For The Neurorehabilitation Of Patients With Attentional Deficits After Acquired Brain Injury. An Ongoing Study

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ABSTRACT

Introduction: Acquired brain injury patients (ABI) have cerebral damage occurring after birth (eg., trauma, hypoxia, stroke) that can affect several domains, including cognitive functions. Up to 80% of ABI patients, regardless of their etiology, show attentional deficits that highly impact their quality of life and independence by hampering the execution of daily tasks(1). Generally, attentional deficits in patients with ABI are treated with cognitive rehabilitation(2). However, several systematic reviews(3,4) have cast doubt on its effectiveness by reporting only mild to moderate effect sizes. Given this information and the high relevance of attentional deficits; brain injury research should explore new and more effective neurorehabilitation tools. Among these emerging techniques,

neurofeedback (NF) is an established instrument to improve attentional abilities in patients with hyperactivity and attentional disorder(5). NF is an applied psychophysiology technique, that promotes EEG entrainment based on operant conditioning and associative learning, during which a subject receives online feedback on their brainwaves while performing a task, with the goal of normalizing brain oscillations(6).
Methods: This ongoing study aims to validate NF as an attentional rehabilitation tool for ABI patients. It is a randomized-controlled trial with 30 subjects with ABI (with mixed etiologies, matched by cognitive profile and rehabilitation goals) divided in two groups: a) receiving NF and b) control group, receiving standard cognitive therapy. The NF training consists of 12 sessions of 20 minutes that aim to increase β power (ie., 16 – 25 hz) and decrease θ power (ie., 4 – 7 hz). The task is based on a visual feedback (ie., video expanding/shrinking). The two groups receive the same amount of intervention hours (ie., NF or cognitive therapy). We assess both behavioral and electrophysiological measures for efficacy (ie., attentional behavioral tests, EEG power and connectivity, auditory P300 evoked potential). Moreover, we also measure transfer to daily life and motivation of the intervention through self-reported questionnaires. We will compare pre-post differences between the two groups.
Conclusions: The present protocol has the potential to expand the available neurorehabilitation tools for patients with brain injury with minimum invasiveness and high accessibility of the technique. Data acquisition is currently ongoing and we will present at the IBIA 2025 conference preliminary results.
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204 Emergence From The Post-traumatic Confusional State in Patients With Disorders Of Consciousness: A Retrospective Analysis On Sample Characteristics And Predictors.

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ABSTRACT

Introduction: The duration and characteristics of the Post-traumatic Confusional State (PTCS) in patients that have emerged from a prolonged Disorders of Consciousness (DoC) has not been investigated yet. OBJECTIVES: To describe the frequency and attributes of PTCS in patients with prolonged DoC (ie., >28 days post-injury), as well as the factors predicting emergence from PTCS.
Methods: We retrospectively included patients from the database of a specialized neurorehabilitation service. Inclusion criteria were: patients (admitted January 2004 to October 2023) with a prolonged DoC caused by a traumatic brain injury (TBI), ≥ 16 years old, ≤ 6 months post-injury at admission, records of follow-up data for at least 3 months post-admission. Patients were assessed weekly with the Coma Recovery Scale-Revised (CRS-R) while in DoC; and with the Mississippi Aphasia Screening Test (MAST) and Galveston Orientation and Amnesia Test (GOAT) when they emerged from the minimally conscious state (eMCS). We conducted univariate analyses on sample characteristics and a multivariate logistic regression analysis on predictors of emerging from the PTCS.
Results: 88 patients (VS/UWS=40, MCS-=28; MCS+=20, on admission) met inclusion criteria. 47 of them emerged from the MCS (VS/UWS=11, MCS-=16; MCS+=20, on admission) with these characteristics on the CRS-R (N=16 emerged with functional object use, N=13 with functional communication, and N=18 with both). 25 out of the 47 patients who emerged (VS/UWS=4, MCS-=8, MCS+=13, on admission) overcame PTCS a mean of 98.5±60 days after emerging from MCS. A total of 13 patients required a modified GOAT due to global aphasia (N=5) or anarthria (N=8). None of the patients with global aphasia overcame PTCS, while 3 of the 8 patients with anarthria did. Of the 47 patients who emerged from MCS, those who emerged from PTCS were younger ($p<0.05$), had shorter time since injury ($p<0.05$), emerged from MCS earlier ($p<0.01$), showed functional communication upon emerging ($p<0.05$), and had higher scores on the CRS-R ($p<0.01$) and GOAT ($p<0.01$) at the time of MCS emergence. The multivariate regression analysis identified the initial GOAT score as the strongest predictor of PTCS emergence ($p<0.01$).
Conclusions: Even though diagnosis at admission is a known predictor of emergence from the MCS, it does not appear to play a role in emergence from the PTCS. The overall cognitive state at emergence from MCS (eg. initial GOAT score) and the communication level (eg. presence/absence of aphasia or anarthria) seem to be particularly relevant in establishing the odds of patients to emerge from the PTCS.
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205 "We Don't Want to be Labelled, but at the Same time, We Need to Explain Our Condition": Designing a Toolkit to Raise Awareness about the Realities Faced by Individuals Who have Experienced Moderate to Severe Traumatic Brain Injuries

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ABSTRACT

Objectives: 1) To document the situa4ons of discriminanation that can be experienced by individuals living with TBI 2) To co-construct a toolkit aimed at reducing these situationsof discrimination.

Methods: This project was carried out by a specialized community organization providing services to individuals living with TBI and their loved ones. To address the first objective, semi-structured interviews were conducted with healthcare professionals, individuals living with TBI, and caregivers. These interviews were analyzed thematically using the Dedoose software. The findings informed the co-construction phase of the
project. A steering committee comprised of four community workers, one individual living with TBI, and a knowledge broker, participated in nine meetings to develop the toolkit. Co-construction activities included brainstorming sessions, crea4ng a persona and presenting prototypes.

Results: A total of 11 interviews were conducted (n=5 individuals with TBI, n=3 healthcare professionals, n=3 caregivers). Individuals with TBI reported experiencing discrimination, in the form of insistent stares in public places and derogatory comments about their employability. Healthcare professionals highlighted discrimination related to access to certain services, while caregivers identified a lack of knowledge about TBI as the primary cause of discrimination. The co-construction process resulted in the development of a toolkit that includes: nine video vignettes, ten informational cards to challenge preconceived ideas about TBI (n=6) and caregiving (n=4), a comic strip, a glossary defining terms related to TBI, and a poster with actionable strategies for addressing bullying or
discrimination. The videos and informational cards cover various themes identified during the interviews, such as permanent sequelae, relationships, employability, and substance use in the context of TBI.

Conclusions: This project successfully developed concrete tools to raise public awareness about the realities and challenges faced by individuals living with TBI. These resources help demystify TBI, thereby helping to reduce the risk of discrimination.

206 Exploring the Feasibility of Implementing SAFIR-E©, a Support Program for Families of Individuals Living with Acquired Brain Injury in a Community Context

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ABSTRACT

Introduction: The unpredictable nature of traumatic brain injury (TBI) forces families to adapt to a caregiving role for which they are often inadequately prepared. This can lead to several negative consequences for both the family and the individual living with TBI, such as anxiety, social isolation, reduced mental health and financial difficulties. As the needs of these families evolve beyond the initial rehabilitation phase, it becomes crucial to implement interventions that support families coping with permanent sequelae. Community organizations are well-positioned to provide long-term support to TBI families, but should be guided by evidence-based practices to ensure the effectiveness of their services. SAFIR-E© [Soins Aux Familles : Intervention pRécoce en Équipe] is an interdisciplinary intervention designed for ABI families, including five key components: comprehension of the family ecosystem, emotional support, information dissemination, family engagement, and care coordination. SAFIR-E© could offer a promising solution for delivering tailored and effective support within community organizations but, to date, has only been implemented in acute settings.

Objectives: To explore the key facilitators and barriers to the implementation of SAFIR-E© within a community organization, as perceived by interprofessional community workers and managers.

Methods: Based on a descriptive qualitative design, semi-structured interviews will be conducted with community workers and managers of a community organization in the Vaud region in Switzerland between October and November 2024. A sample of 15 participants is anticipated to be sufficient to reach data saturation. The Consolidated Framework for Implementation Research supported the development of the interview guide. Interviews will be recorded, transcribed (verbatim), and analyzed using both inductive and deductive methods.

Results: Finding from this study will inform the implementation strategies, thereby improving both its acceptability and usability within a new context. The data will contribute to the body of evidence regarding SAFIR-E© adaptation process to effectively implement this innovative practice.
Conclusions: Ultimately, the successful implementation of the SAFIR-E© intervention is expected to limit the consequences inherent in the role of caregiver and support families in their experience by offering them targeted and effective assistance.

207 Bridging the Gap; Transitional Rehabilitation from Hospital to Home for Adults with an Acquired Brain Injury in Ireland.

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ABSTRACT

It is estimated that approximately 19,000 people experience an acquired brain injury (ABI) in Ireland each year, which impacts significantly on quality of life for the person and their families. International research indicates that people with an ABI who access neurorehabilitation services earlier have better outcomes than those who access services later. Unfortunately, the lack of community-based transitional rehabilitation services for people with an ABI leaving hospital often results in many people being placed in inappropriate placements in nursing home facilities or being discharged home without supports. Acquired Brain Injury Ireland is a leading provider of community-based neurorehabilitation for people with an ABI in Ireland. In 2007, ABI Ireland, in partnership with the Health Service Executive, established the first transitional rehabilitation service for adults with an ABI in the Northwest of Ireland. The service provides short-term high intensity neurorehabilitation to four individuals at any one time and provides a rehabilitation pathway from hospital to home. This model focuses on enhancing the independent living skills of participants, by supporting the individual and their families to understand the impact of the ABI, and through the development of individualised neuropsychological and cognitive rehabilitation programmes. Support is provided in the service Monday to Friday, with individuals returning home to their families / community at weekends, to ensure transfer of their skills and strategies to their home environment. Rehabilitation is provided by Neuropsychology, Occupational Therapy and Rehabilitation Assistants on site and referrals can be made for Speech and Language Therapy and Physiotherapy. Upon discharge, a community-based rehabilitation team can continue to provide essential supports as the individual transitions home full-time. The model also allows for participants who previously accessed the transitional rehabilitation service to access a readmission to address new goals or prevent deterioration. Since its establishment, the transitional rehabilitation service has supported over 250 people with an ABI and their families. With 85% of admissions to the service coming from the acute hospital, the service provides a timely and direct route for ongoing rehabilitation before the person returns home. The average length of time from injury to admission into the service is 17 weeks; therefore, optimising the potential for rehabilitation and recovery. Most people who have accessed the service have successfully been discharged home within 12 weeks. From 2022 – 2023, data analysis of aggregated Mayo-Portland Adaptability Inventory – 4 outcomes demonstrated that participants (n=10) who accessed the service achieved a reduction in their limitations across all subsets; abilities, adjustment and participation. Given the success of the model, it is proposed that it be replicated to meet the needs of more adults with an ABI in Ireland.

208 The Brief Evaluation of Receptive Aphasia (BERA) in Patients with Severe Brain Injury: A Validation Study

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ABSTRACT

The Brief Evaluation of Receptive Aphasia (BERA) is a novel tool designed to assess receptive phonological, semantic, and morphosyntactic abilities in patients with severe brain damage, based on visual fixation of a target image presented next to a specific distractor. This study aims to provide validation data regarding the administration of the BERA in post-comatose patients with severe brain injury. The BERA and Simplified Evaluation of CONsciousness Disorders (SECONDs) were administered to 30 French-speaking adult patients with preserved visual fixation or pursuit (21 patients in a minimally conscious state and 9 patients emerging from it). The BERA assessments were performed on two consecutive days, by two blinded raters, to determine the validity and reliability of the tool. Very strong and strong correlations were found between versions 1 and 2 (internal validity: $\rho = 0.83$) and between BERA scores and a language score extracted from the command-following and communication items of the SECONDs assessment (concurrent validity: $\rho = 0.73$). Excellent intra- and inter-rater reliability was also observed ($\rho = 0.86$ and ICC = 0.996). Results show that the BERA is a fast tool ($\mu = 13.9$ min; $\sigma = 4.7$ min), which is appropriate to refine language profiles in minimally conscious and emerging patients. The BERA scores may indeed indicate selective receptive difficulties in phonological, semantic, and morphosyntactic domains, which could

help guide speech-language therapy. These data finally suggest that the BERA may complement other scales such as the SECONDs for assessing and diagnosing post-comatose patients.

209 Short-term Outcomes During Early Intensive Neurorehabilitation For Prolonged Disorders Of Consciousness: Results Of The DOCTOR Study

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ABSTRACT

Background: Recent advancements in medical care have significantly improved survival rates for patients with severe brain injuries. Consequently, there has been an increase in the number of survivors with prolonged disorders of consciousness (PDOC). Literature suggests that early intensive neurorehabilitation (EIN) is crucial for achieving optimal outcomes in these patients.

Objectives: This study evaluates the frequency and extent of consciousness recovery, mortality rates, and complications during a nationwide EIN programme for PDOC-patients following acquired brain injury.

Methods: A prospective cohort study was conducted involving PDOC-patients aged 16 years and older, admitted to the EIN department centralized in a single rehabilitation centre in the Netherlands (Libra Rehabilitation & Audiology). The EIN program provides subacute medical care and rehabilitation for up to 14 weeks. The outcome measures included the level of consciousness (CRS-R), mortality, and the number of complications.

Results: Among the 104 participants:

- 68% reached a minimally conscious state with command-following or higher during EIN.
- 44% regained full consciousness.
- The mortality rate during EIN was 6%, with 50% of the deaths resulting from non-treatment decisions or withdrawal of life-sustaining treatment.
- Nearly all PDOC-patients experienced at least one medical complication, with 30% requiring hospital readmission.

Conclusions: During the EIN programme, many PDOC-patients achieved at least a minimally conscious state or even consciousness. These outcomes and the high incidence of medical complications emphasize the need for intensive specialized care for all PDOC-patients. The outcomes of this study can assist health professionals in providing better information about the short-term prognosis to the families of PDOC-patients.

210 Long-term Outcomes After Specialized Intensive Neurorehabilitation For Prolonged Disorders Of Consciousness: Results Of The DOCTOR Study

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ABSTRACT

Background: Following an acute brain injury, patients may develop prolonged disorders of consciousness (PDOC). While specialized Intensive Neurorehabilitation has been proven effective, its long-term impact on recovery of consciousness and independency in daily living is somewhat limited. The novel, nationwide chain of care for PDOC-patients in the Netherlands provides the opportunity of gathering this information about virtually all new cases in a single country. This chain of care includes 14 weeks of Early Intensive Neurorehabilitation (EIN), followed by Prolonged Intensive Neurorehabilitation (PIN) for those who do not regain consciousness during the initial 14 weeks of EIN.

Objective: To determine the long-term outcomes in PDOC-patients, in terms of both level of consciousness and level of functioning.

Methods: This research is a longitudinal prospective cohort study with a 2-year follow-up. It included all PDOC patients aged 16 and older admitted to a nationwide specialized PDOC chain of care, starting at a single rehabilitation center in the Netherlands. Outcomes were measured using the Coma Recovery Scale-Revised (CRS-R), the Disability Rating Scale (DRS), and the Functional Independence Measure (FIM) up to 2 years post-admission to the specialized rehabilitation center.

Results: Of 129 patients included, mean age of 38 years, 43% regained consciousness during the first 14 weeks of specialized treatment. An additional 20% regained consciousness after this period, with 10% within the first 6 months after admission. Functional independency (mean total FIM and DRS scores) improved over time, with the most significant gains observed

between week 14 and 28 post-admission. Among conscious survivors, the rate of independent functioning (FIM total score ≥ 78) increased from 5% at week 14 to 47% at the 2-year follow-up.
Conclusion: PDOC-patients can show improvements in both level of consciousness and level of functioning beyond the early phases of specialized rehabilitation, up to 2 years post-injury. Most recovery occurs within the first 6 months after admission to rehabilitation, but meaningful progress is still possible even after one year in a context of continued specialized intensive rehabilitation. These findings highlight the importance of providing specialized care for PDOC-patients during the first 2 years following their injury.

211 Relationship Satisfaction and Continuity Following Acquired Brain Injury: The Role of Social Cognition and Coping

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ABSTRACT

The current study explores to what extent three commonly discerned aspects of social cognition (emotion recognition, theory of mind, and empathy) are associated with relationship satisfaction and relationship continuity following acquired brain injury (ABI), thereby considering the viewpoints of both individuals with ABI and their partners. We currently report on an analysis of the first 56 couples included in our cross-sectional study. Results indicate that the relationship satisfaction of partners of individuals with ABI correlates with their assessment of their injured partner's empathetic abilities. In addition, the relationship continuity experienced by partners of individuals with ABI was found to be associated with their assessment of their injured partner's empathic abilities, and the injured individual's capacity to recognize sadness in facial expressions. No significant correlations were found between the relationship satisfaction of individuals with ABI and any of the aspects of social cognition. For now, there are sufficient indications that social cognition problems have the potential to affect partner relationships following ABI, underscoring the importance of addressing social cognition post-ABI. Final analyses on 92 couples, available by the end of 2024, will provide more conclusive results. Furthermore, the role of social cognition and coping in relation to the partner relationship and mental wellbeing following ABI will be considered in the upcoming analyses.

212 Participation in the First Two Years After Mild Stroke in Adults Aged 18 to 64

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ABSTRACT

Background: Mild stroke affects a growing number of young adults under the age of 65, accounting for almost one in five cases in Canadian hospitals. Although often perceived as less severe than other types of strokes, mild stroke can have subtle but significant consequences that may restrict participation in more complex occupations such as driving, work and leisure. However, few services tailored to the specific needs of young adults with mild stroke are available, due to the underestimation of the consequences of this condition and the limited data on their long-term participation.
Objectives: The aim of this study is to document changes in the participation of adults aged 18 to 64 with mild stroke, by comparing two measurement periods, taking place on average 6 months post-stroke (T1) and 12 months post-stroke (T2).
Methods: A longitudinal prospective single cohort study design was used. Participants were 57 adults with mild stroke (54% women; mean age = 52 years, range = 22-64). Two standardized questionnaires were administered to participants at T1 (n=57; mean time after stroke = 6 months, range = 3-12) and T2 (n=44; mean time after stroke = 17 months, range = 13-23): the participation scale of the Mayo-Portland Adaptability Inventory-4 (M2PI) and the recently developed Participation after a Mild Stroke Questionnaire (PMS-Q). The interval between T1 and T2 ranged from 8 to 14 months (mean = 10 months). Data were analyzed using mixed model ANOVAs.
Results: Overall, mean participation scores tended to remain stable between the two measurement times, for both the M2PI and the PMS-Q ($p > 0.1$). However, a statistically significant improvement was observed from T1 to T2 for work and leisure items on the M2PI ($p < 0.05$), although the scores suggest that some restrictions persisted at T2 (e.g., partial resumption of previous responsibilities, activities of reduced intensity and complexity). On the PMS-Q, no significant changes were

found over time for individual items. At both T1 and T2, sleep had one of the lowest participation scores on the PMS-Q, along with two work-related items, physical exercise, physically demanding activities, and intimate relationships.
Discussion: In general, participation remained stable over time, although there were notable variations between participants. These results suggest that a portion of young adults could benefit from targeted interventions to improve participation in the activities most affected, such as sleep, return to work and leisure. Further efforts are needed to develop and implement a broader range of evidence-based rehabilitation interventions to meet the long-term participation needs of young adults with mild stroke.

213 Executive Functioning 30 Months after Early Childhood Concussion

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ABSTRACT

Every year, 200 000 children experience a concussion in Canada (Goulet & Beno, 2023). Concussions are the most prevalent type of traumatic brain injuries (TBI) and disrupt physical, cognitive, family, social and behavioral functioning (Beauchamp & Anderson, 2013). Among the former, executive functions (EF) can be vulnerable to disruption. EF include abilities such as inhibition, planning and flexibility which are especially important in childhood because they form the basis of higher order abilities necessary for social interactions and academic achievement. While many studies report on EF after pediatric TBI, few have focused on the integrity of these abilities after milder injuries or in preschool children, despite their importance for school readiness. The objective of this study was to document EF in the long-term after early childhood concussion. Children (n= 169, mean age= 5.66; SD= 1.00) with either concussion (n= 66), orthopedic injury (OI, n= 42) or typical development (TDC, n= 61) aged 18 months to 5 years were recruited to participate in a longitudinal study. At 30 months post-injury, participants' parents completed the Behavior Rating Inventory of Executive Function (BRIEF) measuring inhibition, shifting, emotional control, working memory, planning/organization, inhibitory self-control, flexibility and emergent metacognition. Participants were divided into a younger (4 to 5 years at the time of testing) and older (5 to 7.5 years) group. ANOVA showed no differences between the concussion (n= 47), OI (n= 25), and TDC (n= 44) for older children, $F(2,113)= 0.667$, $p= 0.515$ in the standardized global executive composite score. However, in the 4-5 years group, the global executive composite score differed significantly between groups, $F(2,50)= 4.875$, $p= 0.012$. Children with concussion (n= 19) ($p= 0.23$) had poorer EF than TDC (n= 17) (mean difference= 9.437; SD= 3.404), but not from OI (n= 17) ($p= 1.000$); however, OI also had poorer EF than TDC ($p= 0.032$) (mean difference= 9.294; SD= 3.498). Differences were also observed for inhibition $F(2,50)= 4.809$, $p= 0.012$ between the TBI and TDC $p= 0.012$ (mean difference= 10.034; SD= 3.317), planning/organization $F(2,50)= 4.541$, $p= 0.015$ between the OI and TDC, $p= 0.025$ (mean difference= 10.647; SD= 3.881), inhibitory/self-control $F(2,50)= 4.658$, $p= 0.14$ between the concussion and TDC $p= 0.018$ (mean difference= 10.158; SD= 3.538) and emergent metacognition $F(2,50) = 3.859$, $p= 0.028$ between concussion and TDC, $p= 0.044$ (mean difference= 9.269; SD= 3.662). The findings suggest that children injured younger have more long-term effect on EF than those injured older. Possible interpretations for age differences could be related to neuroplasticity effects or to the exposure of school-age children to EF training as opposed to those not yet in formal school settings. These results underscore the importance of screening for EF and monitoring progression throughout the early years.

214 Perceptual-Cognitive Functions and Self-Efficacy mTBI Assessment in University Varsity Athletes: Preseason, Acute Phase, and Return-to-play

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ABSTRACT

Background: Mild traumatic brain injury (mTBI) affects tens of thousands of athletes yearly. The diagnosis and the monitoring of this frequent injury among university athletes remain a challenge for healthcare professionals, encouraging research to look at innovative ways to assess and monitor mTBI, in various areas to allow for save return-to-play (RTP). Recently, perceptual-cognitive performance, as well as self-efficacy, have gained popularity among healthcare providers.
Objective: The aim of this study was to explore the effect of sustaining a mTBI on perceptual-cognitive performance and self-efficacy in athletes when comparing preseason (pre-injury) values to acute post-injury and return-to-play values.
Methods: University varsity athletes from the Université of Québec in Trois-Rivières (n=159) completed a Neurotracker and self-efficacy preseason (PS) baseline assessment. Participants who sustained a mTBI during the sporting season joined the post-injury phase and underwent a 48-72 hour post-injury (T1) and a RTP (T5) assessment. The perceptual-

cognitive functions were assessed on the Neurotracker, where a mean speed threshold (MST) is established after three blocks of 20 trials. Self-efficacy related to athletic skills and mTBI presentation related to physical activity scores were obtained by completion of two questionnaires. Wilcoxon signed-ranked test was performed to compare Neurotracker and self-efficacy PS, T1, and T5 scores.
Results: 20 student-athletes (9 females) sustained a mTBI and joined the post-mTBI phase. The average number of days between mTBI and T5 was 15.17±2.48 days. A significant difference was found between T5 Neurotracker MST and T1 Neurotracker MST (z=-2.52, p=0.01), with higher MST being noted at T5. Significant differences between T1 and PS in self-efficacy questionnaire related to athletic skills scores (z=-3.10, p=0.00) were reported, suggesting that T1 scores were lower. Significant differences were found between T5 and PS (z=-2.21, p=0.03) and between T5 and T1 (z=-2.52, p=0.01), suggesting that T5 athletic skills scores were lower than PS and T1 scores. There were significant differences between T1 and PS in mTBI presentation related to physical activity self-efficacy scores (z=-3.15, p=0.00), suggesting that T1 scores were lower. A significant difference was found between T5 and PS in mTBI presentation related to physical activity self-efficacy scores (z=-2.53, p=0.01) with lower scores at T5. Significant differences were also observed between T5 and T1 (z=-2.67, p=0.01) suggesting that T5 scores were lower.
Conclusion: This study indicated that perceptual-cognitive performance, as assessed by the Neurotracker, does not seem to be affected by the mTBI in the acute phase. However, the learning gains of a perceptual-cognitive task seem to be negatively impacted by the mTBI and to be normalizing after repeated exposure to the Neurotracker. Furthermore, the results showed that the athlete's self-efficacy related to athletic skills and physical activity can be significantly decreased by the mTBI in the acute phase and at the RTP.

215 Evaluating A Communication Partner Training Program For Health Professionals Communicating With People With Aphasia

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ABSTRACT

Background: Aphasia affects a third of all stroke survivors and > 50% of people with other acquired brain injuries, hindering effective communication between patients and healthcare professionals. Aphasia makes it difficult for patients to get the attention of healthcare professionals, communicate basic healthcare needs, and get oral and written health information. Consequently, initiatives towards reducing the communicative barriers in healthcare is needed, including the use of alternative and augmentative communication and adapted written materials, but also "top-down" system changes. Such initiatives include training of medical staff, often labelled communication partner training (CPT), to enable supported communication. A Danish CPT program, KomTil, was co-developed with collaborators with aphasia, significant others of people with aphasia, and multidisciplinary healthcare professionals across sectors, and the current study aimed to investigate:
1: Immediate and long-term possible benefits of CPT KomTil on knowledge and skills
2: Possible predictors of benefits of CPT KomTil
Conclusions: Participants included staff with different professional backgrounds providing neurorehabilitation to people with aphasia in hospital or municipalities. Participants received training in CPT KomTil, and knowledge and skills were assessed using the Health Professionals and Aphasia Questionnaire (HPAQ) before training, six to eight weeks post-training, and one-year post-training. HPAQ consists of 16 items answered on a visual analogue scale concerning the following domains: Knowledge, skills, attitudes and emotions, practice, and environment. The total score of the HPAQ ranges from 1-100. Data were analysed using linear mixed-effects regression models.
Results: A total of 240 healthcare professionals participated in the survey. The HPAQ total score changed over time ($\chi2(3) = 328.8$; $p < .001$). Compared to baseline, HPAQ improved by 14.5 points (SE = 0.76; $p < .001$) 6-8 weeks post-training, and by 13.1 points (SE = 0.92; $p < .001$) one-year post-training. Sector and years of experience were significant predictors of perceived benefit. Healthcare professionals at the municipalities reported greater immediate improvements compared to hospital staff ($\chi2(3) = 9.9$, $p = .02$). Among hospital staff, acute units reported greater improvements than rehabilitation units ($\chi2(4) = 22.6$, $p < .001$). Professionals with less experience (≤ 5 years) reported greater improvements compared to more experienced staff (> 5 years) ($\chi2(3) = 18.2$, $p < .001$). There was no difference across three groups of professions (therapists vs. nurses and assistants vs. others), ($\chi2(8) = 13.5$, $p = .10$).
Conclusions: The participating healthcare professionals reported benefits of the Danish CPT program indicating that they perceived themselves and their work environment as more competent for health communication with people with aphasia after having received training in the CPT scheme, and the benefit was maintained one-year post-training. Furthermore, healthcare professionals at municipalities and acute units reported greater benefits, as did healthcare professionals with fewer years of experience.

216 Fatigue is a Dynamic Symptom: Real-Time Monitoring of Fatigue in Daily Life of Adults with Cerebral Palsy

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ABSTRACT

Background and Aims: Fatigue is a distressing symptom in many neurological conditions. Patients describe that symptoms tend to fluctuate throughout the day and may exacerbate from one moment to the other. This pilot study aimed to evaluate the feasibility of real-time monitoring for mapping the temporal dynamics of fatigue in daily life of adults with cerebral palsy (CP).

Methods: A prototype 20-item survey, Fatigue in Daily Life (FIDL), was designed for the assessment of momentary fatigue and its antecedents, consequences, and co-occurring symptoms. Data was collected ten times a day for seven consecutive days using the smartphone app, SEMA³. Semi-structured interviews were conducted with participants after real-time monitoring. Quantitative data were analyzed using mixed-effects models, in which observations (Level 1) are nested within days (Level 2) and persons (Level 3), to estimate the intraclass correlation coefficient (ICC) of the fatigue item. Qualitative data were analyzed to explore content validity of FIDL and acceptability of the sampling schedule.

Results: Ten adults with CP completed the study (no drop-outs), six females (60%), mean age = 43.7 years, Gross Motor Function Classification System ranging from I to III. The average response rate on the repeated surveys across days was 75.5%. Eight participants (80%) responded to at least 50% of the surveys. Median completion time was 1.67 minutes. The ICC of fatigue was 0.04 for Level 2 (days) and 0.38 for Level 3 (persons), indicating that 4% and 38% of the variance is attributable to stable differences between days and persons, respectively. Thus, the remaining 58% of the variance is due to daily fluctuations in fatigue. Univariate regression analyses showed that energy (B = -0.86), sleepiness (B = 0.68), and exhaustion (B = 0.63) had the strongest association with fatigue. Seven participants (70%) reported they could express exactly 'how they felt' when completing the FIDL survey, and 80% reported that answering the survey was easy and manageable. Accordingly, 80% reported that the survey was not demanding or extensive to complete. Those reporting difficulties requested an open-comment field to elaborate on their experiences. Four participants (40%) reported that it was difficult to respond to all ten surveys per day, and 20% would prefer fewer surveys per day or fewer items per survey. The reasons for unanswered surveys were related to being busy at work, having a business meeting, or being engaged in sports or other activities, which prevented the participant from responding. The duration of the study was acceptable to all participants.

Conclusion: Fatigue is a dynamic symptom, and it is feasible for adults with CP to monitor fatigue using the FIDL survey. Pilot results inform the design of a planned study on the dynamics of fatigue across adults with CP and acquired brain injury.

217 Educational Achievements, Labour Market Attachment and Family Establishment in Children of Parents or Siblings with Acquired Brain or Spinal Cord Injury: A Nationwide Register Study

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ABSTRACT

Background: Children, who experience acquired brain injury (ABI) or spinal cord injury (SCI) in a parent or sibling (familial injury), have an increased risk of developing psychosocial problems indicating long-term socioeconomic consequences, which remain unknown.

Objectives: To investigate the long-term socioeconomic consequences on children who experience ABI or SCI in a parent or sibling, in relation to; 1) educational achievements, 2) labour market attachment, and 3) family establishment.

Methods: A nationwide register-based study utilizing population register data provided by Statistic Denmark conducted by linking several national registers. The study population (n=111,366) included children born in Denmark from 1977 to 2006, who were 0-17 years of age at the time of familial injury. The remaining cohort of children without familial injury constituted a reference population (n=2,180,148). The study population included four groups: A) children of a parent with ABI; B) children with a sibling with ABI; C) children of a parent with SCI; D) children with a sibling with SCI. Analyses included linear and logistic regression models performed separately for the four groups, comparing each with the reference population adjusting for parental socioeconomic status.

Results: Across groups, children affected by familial injury achieved significantly lower grade point average (GPA) in 9th grade exams and had a significantly lower probability of commencing and completing upper secondary education compared to reference population. The highest mean difference (MD) in GPA was found in group B (MD -0·44 [95% CI -0·47

to -0·41]), and the lowest odds ratio (OR) regarding commencing and completing upper secondary education was found in group D (OR 0.39 [95% CI 0.26 to 0.59]) and (OR 0.34 [95% CI 0.16 to 0.72]), respectively. A significantly higher probability of long-term sick leave was found in group A, B, and C, highest in group C (OR 1.46 [95% CI 1.30 to 1.64]). A significantly higher probability of disability pension was found in group A, B, and D, highest in group D (OR 2.84 [95% CI 1.81 to 4.44]). Across groups, the children had a significantly lower probability of marriage by age 26, lowest in group D (OR 0.73 [95% CI 0.62 to 0.86]). For those married, a significantly increased risk of divorce was found in group A, B, and D, highest in group D (OR 5.24 [95% CI 2.62 to 10.49]). Lastly, children in group A, B, and C had a significantly lower probability of parenthood by age 26, lowest in group C (OR 0.84 [95% CI 0.75 to 0.94]). Conclusion: Children exposed to familial injury were significantly affected on educational achievements, labour market attachment, and family establishment. The findings emphasize the serious impact of familial injury and the need for early and continuous supportive interventions to the children and the entire family.

218 Musculoskeletal Injury Location Is Affected by History of Mild Traumatic Brain Injury

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ABSTRACT

Introduction: Mild traumatic brain injury (mTBI) and musculoskeletal injury (MSKI) both negatively impact the health and readiness of United States (US) service members. Little is known on whether specific types and locations of MSKIs are more prevalent prior to or following mTBI. Therefore, the objective of this study was to calculate the proportion of MSKI according to location of injury before, concurrent with, and after mTBI among US service members with MSKI. We then compared these proportions to MSKI proportions among those without mTBI.

Methods: This cross-sectional study included 553,318 US service members who joined between 2016 and 2020, sustained an MSKI during service, and had data in the Military Health System Data Repository through 2023. The first MSKI after joining (i.e., incident MSKI) was identified by anatomical complex (location), primary tissue type affected and International Classification of Functioning, Disability and Health codes. Incident mTBI was identified using International Classification of Diseases, 10th revision codes defined by the Armed Forces Health Surveillance Division. We calculated proportions of incident MSKIs and estimated 95% confidence intervals (CIs), categorized by location and timing relative to mTBI. We used chi-squared tests to assess differences in MSKI location by mTBI group.

Results: The average (SD) age at military entry was 20.7 (3.5) years, 78.7% were male, 44.3% were in the Army, and 3.3% sustained an mTBI during the study period. MSKI location differed between mTBI and non-mTBI groups (p's < .01). Among the 535,199 without mTBI, the most common MSKI locations were ankle/foot (32.7%; 95% CI 32.6-32.9%), knee (23.3%; 95% CI 23.1-23.4%), and lumbopelvic-hip (20.2%; 95% CI 20.1-20.3%). Of the 14,368 incident MSKIs that occurred prior to mTBI, the most common locations were ankle/foot (33.3%; 95% CI 32.5-34.1%), knee (24.9%; 95% CI 24.1-25.6%), and lumbopelvic-hip (19.6%; 95% CI 18.9-20.2%). The most common locations for MSKIs concurrent with mTBI (n = 831) were cervicothoracic related (40.7%; 95% CI 37.3-44.0%), lumbopelvic-hip (13.6%; 95% CI 11.3-15.9%), and shoulder (12.0%; 95% CI 9.8-14.3%). After accounting for MSKIs that occurred prior to or concurrent with an mTBI the most common MSKI locations after mTBI (n = 2,920) were ankle/foot (22.8%; 95% CI 21.3-24.3%), lumbopelvic-hip (21.5%; 95% CI 20.0-23.0%), and knee (18.4%; 95% CI 17.0-19.8%). From pre to post mTBI, the largest difference in proportions were observed for ankle/foot (Δ-10.5%; 95% CI -11.3 to -9.8%) and cervicothoracic (Δ6.9%; 95% CI 6.1-7.7%) MSKIs.

Conclusions: In this study of 553,318 US service members with MSKI, 3.3% of whom had mTBI, the most common MSKIs before and after mTBI were ankle/foot injuries. The most common concurrent MSKIs occurred in the cervicothoracic region. Results highlight differences in MSKIs relative to an mTBI event, which helps us to understand potential mechanisms of injury.

219 EExercise-Induced Changes in Functional Brain Activity in Children with Concussion

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ABSTRACT

Background: The last decade has led to considerable change in our approach towards concussion management. No longer is it thought that rest-is-best after a concussion. Instead, it is now thought that exercise-is-medicine for concussion, with dozens of studies (and meta-analyses of them) showing that submaximal aerobic exercise can reduce concussion symptoms or time to symptom resolution. However, we do not know how the exercise being prescribed, post-concussion, impacts

the brain with respect to functional activity in these patients. The goal of this study was to perform the first investigation of the effects of a single bout of sub-maximal aerobic exercise on resting state functional brain activity in children with concussion.
Methods: Prospective cohort study of children with their first concussion (and no prior neurological history) within the first four-weeks of injury, and age- and sex-matched controls. The study took place over two visits. Visit 1 involved performing sub-maximal aerobic exercise per the Buffalo Concussion Treadmill Test. Visit 2 involved a baseline functional MRI (fMRI), 10-minutes of treadmill exercise at an intensity calibrated to the results of the Visit 1 exercise test, and a follow-up resting state fMRI, allowing us to assess within-subject and between-group differences in brain activity pre-post exercise.
Results: Currently, recruitment is ongoing, and the data presented here are preliminary and based on 6 children with concussion (4 males, aged 14.8 ± 2.1) and 5 healthy controls (2 males, aged 14.2 ± 2.3). Thus far, using a seed-based approach (with a seed placed in the posterior cingulate cortex, a key anatomical region of the default mode network) we found that there were no pre-post exercise changes in fMRI activity in the healthy controls (threshold, t=2.771, p=0.005). In contrast, in children with concussion, we observed multiple regions of hypoconnectivity following exercise (including the inferior parietal lobule and post-central gyrus). At a group-level analysis, similar hypoconnectivity was observed in the concussion group vs. healthy controls following treadmill exercise.
Discussion: These initial findings suggest that there may be a differential fMRI response to exercise in children with concussion in comparison to their healthy peers. Our initial findings are similar to those reported in adults with mild traumatic brain injury. In completing our study and performing final analyses, important insight may be gained into the impact of exercise on outcomes beyond symptoms, potentially raising the question of how to optimize exercise to promote both symptoms and brain health.

220 "TBIconneCT Enhanced Learning By Connecting Academic Material To Real-Life Scenarios And People": Using Course-Based Clinical Experiences To Deliver Authentic Therapy While Learning

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ABSTRACT

Student clinicians often encounter a disconnect between course-based learning and clinical contexts. This happens when clinicals occur apart from course-based learning. Course embedded clinical experiences (CECEs) address this gap (Hoepner, 2018; Hoepner & Sather, 2020; Hoepner & Zigler-Miller, 2024). CECE follows a cycle, introducing a classroom approach, followed by a related clinical experience supported by an instructor and reflection, additional instruction, another clinical engagement and ongoing reflection as the instructor reduces support. This follows a guided apprenticeship model (Donaldson, 2015; Feeney & Lamparelli, 2002; Hautemo & Dalvit, 2016; Wilson et al., 2017). The instructor models their thinking in-the-moment and during guided class time reflections. Think-aloud sand models by an experienced clinician support deeper reflections by novice, student-clinicians (Ginsberg, Friberg, & Visconti, 2016). Students in a graduate-level, speech-language pathology counseling course (n = 36) demonstrated improved self-efficacy and skill (Hoepner & Zigler-Miller, 2024). With the instructor, they co-delivered motivational interviewing sessions to three clients each semester. The CECE format enabled them to make gains in authentic counseling skills with the support of the instructor and peers.
Methods: The current study examined graduate-level, acquired cognitive disorders course outcomes in a speech-language pathology program. Thirty-seven students (18 in 2022, 19 in 2023) facilitated a modified TBIconneCT social communication and communication partner training program (Hall et al., 2024; Rietdijk et al., 2020; Rietdijk et al., 2019). In 2022, 16/18 participated in the follow-up study, while 19/19 participated in 2023 (n = 35). TBIconneCT is a 10-week, manualized treatment program that incorporates psychoeducation, video modeling, and collaborative goal setting. Post-intervention, students completed an 11-question structured reflection (McAllister & Lincoln, 2004). Student reflections were qualitatively coded using Braun and Clarke's (2021) thematic analysis.
Results: Instructor observations revealed that all students became proficient in delivering the manualized, TBIconneCT intervention. The rate at which they reached proficiency varied substantially across clinicians, but all achieved this benchmark by week 8 or earlier. It was feasible for all students to implement the program given scripting suggested in the treatment manual and PowerPoint slides. Students were allowed to make small changes in wording to address dialectical and personal differences. Qualitative analyses identified several themes about student learning experiences. This included a "better understanding of individuals with TBI's lived experiences", "no two TBI experiences are the same", "making a connection between academic learning and real-life interventions and people", and "increased confidence in clinical and counseling skills."
Conclusions: The scripted, manualized TBIconneCT intervention program made it possible for novice clinicians to successfully implement the intervention. While fidelity was not measured directly, students were observed to fully adhere to the intervention script with changes approved by the course

instructor. Future directions include finalizing the 2023 analysis and making adjustments to the TBIconneCT CECE implementation.

221 Assessing Task-Dependent Neurophysiology During Virtual Reality Treadmill Training in Adults with Traumatic Brain Injury: A Functional Near-Infrared Spectroscopy Feasibility Study

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ABSTRACT

Background: Individuals with traumatic brain injury (TBI) often experience residual mobility deficits that can be improved with treadmill and virtual reality (VR) interventions. However, previous studies have not measured underlying neurophysiology during these interventions nor assessed if acquiring such data is feasible in TBI populations. Thus, the primary purpose of this study was to assess the feasibility of using portable functional near-infrared spectroscopy (fNIRS) to measure neurophysiology during a treadmill task and a treadmill + VR task. A secondary, exploratory aim was to test for possible differences in underlying neurophysiology (i.e., neural activity) during the two tasks.

Methods: This was a single-arm pilot feasibility study that included within-subject fNIRS data acquisition during a treadmill task (TT) and a treadmill + VR task (TTVR), which were completed in a single visit in a hospital setting. All study procedures were approved by the hospital's institutional review board, and all participants provided informed consent prior to the administration of study measures. Eight individuals with chronic moderate to severe TBI were recruited and completed the study. FNIRS data were acquired with the NIRSport2, which is a fully portable system. The device, which weighs less than 2 pounds, was secured to the participants' backs with backpack-like straps; this was placed over the safety harness used for the treadmill tasks. Treadmill tasks were completed on the Motek C-Mill™ treadmill and the VR application was Arkanoid. Participants were advised to pick a walking speed that they could maintain for a 12-minute TT and a 12-minute TTVR; the order of tasks was counterbalanced between participants. Once a preferred walking speed was established, participants began either the TT or VRTT with simultaneous fNIRS recording.

Results: Feasibility benchmarks included safety, acceptability, and fNIRS data quality. Safety was assessed by monitoring and documenting adverse events such as falls or near-falls during TT or VRTT. Acceptability was assessed with an fNIRS acceptability questionnaire, which was completed by participants after the TT and VRTT. Finally, fNIRS data quality was assessed by quantifying the portion of participants from whom quality data could be acquired and by assessing the proportion of data files for which standard fNIRS data analysis steps (conversion, spatial registration, and temporal processing – which includes motion correction) could be completed. All feasibility benchmarks were met. The fNIRS protocol used in this study was safe for all participants and acceptable to 87.5% of participants. FNIRS data acquisition and quality benchmarks were achieved for 87.5% participants. Exploratory fNIRS analyses revealed significantly greater neural activity during the TTVR compared to the TT alone (p values <. 05).

Conclusions: Findings indicated that acquiring neurophysiology data, via fNIRS, during treadmill tasks is feasible in TBI. Thus, this fNIRS protocol can be used in future, larger-scale studies.

222 Resilience, Quality of Life and Outcomes After Stroke In Sweden: A Municipality-Based Outcomes Study

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ABSTRACT

Background: Little is known about the role of resilience in contributing to quality of life and other outcomes after stroke. This study aimed to (i) examine the resilience profile of people living with stroke in the community; (ii) to identify the association between resilience and both functional and patient reported outcomes; and (iii) to examine whether resilience made an independent contribution to quality of life (physical, mental) after stroke.

Methods: Participants were recruited from the Kumla stroke study (n=330), a prevalence study conducted in the Kumla municipality (population approximately 23,000) of Sweden. Study participants completed the Connor-Davidson Resilience Scale, alongside demographic, Riksstroke questionnaire items (examining accommodation, local service needs, patient reported outcomes, comorbidities) and standardised questionnaires/objective performance measures (Montreal Cognitive Assessment; SF-36, Fatigue Assessment Scale, Activities-specific Balance Confidence Scale [ABC]; Timed Chair Stand Test).

Results: Participants of the Kumla study (n=330) comprised 58% males, an overall mean age 74.5 years (SD 13.7), 8.3 (SD 6.3) years post first stroke (85% ischemic stroke, 11% intracerebral haemorrhage, 4% subarachnoid haemorrhage), with no difference between the total sample and the sub-group who completed the CD-RISC (n=122) by sex and age. The total CD-RISC score was 64.8±16.4 with a range of 93 (minimum=7, maximum value=100). Scores were normally distributed

(Kolmogorov-Smirnov .057, p=.200) and internal consistency was strong (Cronbach's alpha .927). Higher resilience scores were associated with the degree respondents were able to return to pre-stroke life and activities and having an independent mindset. Similarly, higher resilience scores were observed among respondents who did not need municipal services such as aids/adaptions or transport, but who also knew where to access support/help if needed. Turning to patient reported outcomes, higher resilience scores were associated with lower levels of fatigue and depression. Two regression analyses then tested whether resilience made an independent contribution alongside other significant variables in predicting quality of life after stroke. The model tested for the SF-36 Physical Component Score (PCS) comprised nine predictors. The full model (comprising 9 variables including resilience) was statistically significant (F9,78 =22.727, p<.001), accounting for 69.2% of the variance in PCS scores, with three significant individual predictors (higher general state of health and Activity-specific Balance Confidence scores; lower experience of pain). The full model (comprising 6 variables) for the Mental Component Score (MCS) was statistically significant (F 6,95 =25.908, p<.001), accounting for 59.7% of the variance, with three significant individual predictors (levels of resilience; decreasing 'ability to return to pre-stroke life' and higher levels of 'feeling depressed'

Conclusions: Resilience levels among the Kumla stroke population were similar to reports of stroke samples from other countries. Resilience was an important predictor of quality of life and future studies could examine interventions to build resilience among stroke survivors.

223 An Exploratory Study About Gender Perspective of Quality of Life, in the Midlife After Stroke

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ABSTRACT

Background: Coping with disabilities in midlife due to a stroke can be particularly challenging, as this stage of life often involves multiple roles and responsibilities. The challenges during midlife after stroke may differ between the genders. This study aimed to explore potential gender differences in QoL and resilience after stroke using both quantitative and qualitative methods.

Methods: For the quantitative analysis, demographic, medical data and questionnaires (Riksstroke questionnaire, SF-36, Connor-Davidson Resilience Scale) were retrieved from a stroke register including 51 individuals (22 men) aged 18-64. Two-sided t-test and chi-square test were used to analyze the data. This was complemented by eight semi-structured telephone interviews with four men and four women, between 45-60 years. Qualitative content analysis was used to analyze the interview data.

Results: There were no statistically significant differences between the genders in the quantitative results. Three themes emerged from the qualitative analysis: 1) A forced lifestyle change, 2) Lack of understanding and support, and 3) Importance of independence and coping strategies. Men described their limitations in broader terms expressing that these challenges hindered their lives and highlighted a need for more support from relatives, friends and health care providers. In contrast, women provided more nuanced descriptions, indicating that they had developed coping strategies and experienced better QoL with higher levels of resilience.

Conclusions: Although the dataset includes a relatively small number of participants in both the quantitative and qualitative analyses, the qualitative findings suggest gender-related differences in QoL after stroke during midlife. These differences were not captured in the quantitative analysis and highlight the need for in-depth qualitative studies to further investigate gender differences in this area.

224 "You're Not Even a Person Anymore": A Qualitative Study of Challenges and Solutions for 2S/LGBTQ People Accessing Services Following a Intimate Partner Violence- Caused Brain Injury

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ABSTRACT

Introduction: Intimate partner violence (IPV) primarily affects women and gender-diverse people. A recent study found 98% of a sample of 2S/LGBTQ Canadians had experienced IPV in their lifetime (physical, psychological, financial, sexual or identity-based abuse). While IPV can manifest in various forms, physical violence is particularly concerning due to its potential to cause significant harm, including brain injury (BI). Although incidence rates are difficult to determine, various studies have demonstrated 70% of those who have experienced IPV, had symptoms consistent with a BI as a result of physical violence. This potentially indicates a substantial number of 2S/LGBTQ people who may access a service provider organization (SPO; e.g., public, private, and mental-health care, emergency services, domestic violence shelter, victim services) after experiencing IPV-caused BI. 2S/LGBTQ survivors are likely to face unique challenges that limit access to necessary support systems following IPV-caused BI. Addressing gaps within SPOs that hinder 2S/LGBTQ survivors from receiving comprehensive, affirming care requires further investigation.

Methods: To explore the unique challenges and solutions for 2S/LGBTQ survivors who access SPOs following IPV-caused

BI, semi-structured interviews were conducted using an interpretive description approach for applied disciplines. Interviews discussed survivor and service provider experiences around 2S/LGBTQ access to SPOs, with a focus on issues and potential resolutions. Interviews were transcribed, de-identified, and analyzed. Line-by-line initial coding was used to group data which was interpreted and mobilized into challenges and informed solutions guided by expert participants.
Results: Eleven service providers and three survivors participated in interviews (N=14; 10/14 (71%) identified as 2S/LGBTQ). The study identified three key challenges 2S/LGBTQ survivors may face when attempting to access SPOs with corresponding solutions. First, most SPOs operate within a cisgender, heteronormative understanding of IPV, making it difficult to recognize IPV and resulting BI within 2S/LGBTQ communities. To amend this, mandatory training and awareness campaigns were suggested as critical steps toward more inclusive care. Second, due to framing IPV in a cisgender, heterosexual lens, 2S/LGBTQ survivors, particularly racialized survivors, often feel excluded and underserved. To address this, restructuring SPOs to create inclusive, intersectional, and trauma-informed services was recommended. Lastly, the compounding effects of adverse social determinants of health (SDOH) further limit survivors' access to services. Targeted interventions addressing both IPV and the specific SDOH commonly faced by 2S/LGBTQ individuals were suggested to remedy these barriers.
Conclusions: Understanding the challenges 2S/LGBTQ survivors of IPV-caused BI encounter is essential for creating equitable services. Targeted solutions like mandatory 2S/LGBTQ specific SPO training, addressing adverse SDOH, and restructuring services are crucial steps. These real, urgent problems affect the lives of 2S/LGBTQ survivors, who deserve access to comprehensive, empowered, and informed care.

226 A Qualitative Study of Student-athlete Experiences of Recovery after Concussion: Results from a Division 1 University in the United States

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ABSTRACT

Background: Reported symptoms and experiences after sport-related concussion can be debilitating and vary dramatically. Research including the patient/student-athlete voice is needed to enrich our understanding of concussion management, rehabilitation, and recovery. Our understanding of return to academics and play decision-making after concussion among athletes is limited to youth or professional age groups, less is known about college-aged athletes in the United States.
Objective: Our objective was to explore how Division I collegiate varsity athletes experience recovery after sport-related concussion, as they manage their diagnosis, symptoms, and return to academics and return to play decision-making.
Methods: We conducted semistructured interviews with undergraduate student-athletes at a Division 1 University in the United States between October 2022 and May 2023 who had experienced at least one diagnosed sport-related concussion as a varsity athlete, inclusive of recently graduated alumni. We analyzed interview data using a modified framework method. We created a post-injury-recovery-return model and we summarize participant experiences in the context of these key moments over time.
Results: Interviews were conducted with 22 student-athletes (women, 59.1%; White, 77.3%; 27.3% Sophomore year) representing 15 sports teams. The majority of respondents had experienced at least one concussion prior to their varsity athletics concussion. Respondents reflected on four key moments in their experience of recovering from a concussion: (1) immediately post-diagnosis, (2) during recovery, (3) making decisions about returning to sport and academics, and (4) returning to sport and academics. We identified the importance of managing expectations, previous concussions, and emotions on recovery and return-to-academics and sport decision-making. We also found these experiences were shaped by the social environment and key actors (coaches, teammates, family members, friends and the University context).
Conclusion: Our findings indicate that experiences after concussion are influenced by factors including expectations for recovery, managing symptoms, and navigating decision-making, and by relationships and the social environment. Systems to improve communication between athletics and academics are needed to support the recovery of college athletes while minimizing disruption. Additionally, considerations of an athlete's social network and collegiate environment should be the subject of future research and inform the development of new treatment and management guidelines for concussion.

227 A SoCIAL Framework for Social Communication Intervention

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ABSTRACT

Purpose: This framework for social, cognitive-communication assessment and intervention "the Social Communication Implementable and Applicable Lens (SoCIAL)" is intended to make social communication assessment and intervention efficient and accessible to practicing clinicians, across a variety of service provision contexts (acute care, outpatient etc.). The framework draws on the best practice recommendations, theories and models outlined in the available literature (e.g., Byom et al., 2020; MacDonald, 2017, Togher et al., 2023). The literature has long highlighted the need for a culturally responsive and individualized approach to assessment and intervention of communication, and this framework is designed to account for, document and address identity, demands, abilities and environment in the communication context of interest, as it applies to quality of life.

Method: The SoCIAL Model (Keegan et al. 2023) was initially developed in response to the need for a framework that could guide clinicians working with those who experienced social communication difficulties after TBI. This model was further modified based on feedback solicited from expert researchers and clinicians at a variety of conference meetings including the 2023 14th World Congress on Brain Injury, Dublin Ireland, 2023 American Speech-Language-Hearing Convention, Boston, MA USA, 2024 International Cognitive Communication Disorders Conference, Chapman, CA, USA. The authors incorporated this feedback and worked on developing an updated clinically applicable framework (Keegan et al., In Press).

Results: This poster presents the framework and includes clinically applicable recommendations for a package of accessible, critically appraised and recommended tools that clinicians may feasibly implement in their assessment of social communication. Assessment recommendations draw on best practice recommendations and literature (Morrow et al, 2020; Sohlberg et al., 2019; Steel & Togher, 2019; Turkstra et al., 2005), and applied to the framework in order to tailor the approach to the individual clients. Similarly, evidence-based intervention approaches, across the continuum of care, that are easily implemented, culturally responsive and ecologically valid (Finch et al., 2016; Lê et al., 2022; Muelenbroek et al., 2019; Togher et al., 2023) are outlined in the context of this framework, where skills, environment, demands and identity are accounted for and emphasized. Case examples are used to highlight the application of assessment and treatment decisions to this SoCIAL framework. This poster will provide a structure for supporting clinical implementation of individualized, literature supported assessments and interventions while also moving translational research forward.

Conclusion: There is a growing literature base that supports a focus on social communication in context, however, there a gap remains between the literature and clinical application, that this framework hopes to begin to address. The SoCIAL framework highlights the intersecting variables (contextual, social, personal and environmental) that can be considered during the assessment and intervention process as person centered, culturally responsive care is planned.

228 Occupational Risk of Low-Level Blast Exposure and Mental Health, Substance Use, Pain, and Self-Harm /Suicidal Behavior Diagnoses: A Longitudinal Study of Post-Deployment Army Enlisted Active Duty Soldiers

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ABSTRACT

Background: Military service member accounts, investigative journalism, and small-scale studies have fueled growing concern about the health effects of repeated low-level blast (LLB) occupational exposure for service members. An emerging line of Department of Defense research uses military occupation (MOS) as a proxy for LLB risk to evaluate health. In this study, we extend this work by applying two published MOS-LLB risk classifications (i.e., Belding; Carr) to a large post-deployment sample and model health outcomes related to LLB exposure risk.

Methods: The analytic sample included 477,746 active duty enlisted Army soldiers returning from Afghanistan/Iraq deployments in FYs 2008-2014, from the Substance Use and Psychological Injury Combat Study. Soldiers were categorized by their LLB risk exposure using the two risk classification strategies as high, medium, low, or mixed for the exposure period (i.e., FY05 through the end of the index deployment [first Afghanistan/Iraq deployment ending in FY2008-2014]). The Belding classification uses broader Department of Defense occupational codes, and the Carr classification uses a more specific set of Army MOS codes. Cox proportional hazard modeling was used to examine the association between LLB risk exposure level and diagnoses for mental health, substance use disorder, pain, and suicide/self-harm during the outcome window (i.e., end of index deployment through censoring at deactivation, end of enlistment, or end of FY2016). Covariates included sociodemographic and military characteristics, and prior history of the health outcomes during the exposure period. Models were run separately for the Belding and Carr MOS-LLB risk classification.

Results: Almost 35% of soldiers were classified as high LLB risk using the Belding classification, compared to 6% with the Carr classification. In both the Belding and Carr adjusted models, soldiers with high LLB exposure had higher hazards for substance use disorder (Belding HR 1.21, 95% CI 1.19-1.23; Carr HR 1.19, 95% CI 1.15-1.22), mental health disorder (Belding HR 1.09, 95% CI 1.08-1.10; Carr HR 1.03, 95% CI 1.01-1.05) and suicide/self-harm (Belding HR 1.08, 95% CI 1.05-1.12; Carr HR 1.09, 95% CI 1.03-1.16) in the outcome window. Soldiers

classified as high LLB risk had lower hazards for pain diagnoses in the Belding model only (HR 0.99, 95% CI 0.98-1.00).
Discussion: In this large sample of enlisted active duty soldiers, those with high LLB risk occupations had an increased hazard for substance use, mental health, and suicide/self-harm diagnoses in the years following deployment. However, high LLB risk occupations were associated with reduced hazard for pain diagnoses following deployment. Results were similar for soldiers classified as high LLB risk using both the broad occupational categories and the more specific Army-specific MOS categories. Future models will examine if results remain consistent when examining risk for incident outcomes.

229 Collaborative Design and Usability Assessment of COOK's Configuration Interface: A Joint Effort Between Occupational Therapy and Computer Science

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ABSTRACT

Introduction: Cognitive deficits resulting from traumatic brain injury can have significant impacts on daily living hindering the ability to perform complex tasks such as meal preparation. Assistive technologies for cognition (ATCs), like the Cognitive Orthosis for coOKing (COOK), are designed to mitigate these deficits. The configuration of COOK, carried out by occupational therapists, must allow them to personalize the interventions provided by COOK to their patients' needs. In a prior study by our research team, occupational therapists were shown a mock-up of the configuration interface and they recommended numerous modifications. However, no consensus was reached on the priority or feasibility of these changes. Results also suggested the importance for therapists to test the configuration interface to assist the team in ensuring the interface's usability.
Objectives: The aim of this study was to (a) Document occupational therapists' perceptions on priority modifications for version 8 of COOK's configuration interface mock-up, while also considering the computer science team's opinions on their feasibility; and (b) Describe the perceived usability of COOK's configuration interface by occupational therapists during the configuration process, in a laboratory setting.
Methods: For the first objective, the TRIAGE method (Gervais & Pépin, 2002) was used with 6 occupational therapists and 2 members of our computer science team, to reach consensus on the priority and feasible modifications to be made to COOK's configuration interface. Then, occupational therapists (n = 9) participated in a simulated configuration of COOK in a laboratory setting using a case study of a person with severe TBI. The Think Aloud method was used to explicit their clinical reasoning, and participants completed the French System Usability Scale questionnaire (F-SUS). All sessions were audio and video recorded, and the data were analyzed using the deductive thematic analysis approach described by Miles et al. (2018).
Results: Six main modifications were deemed feasible and a priority by participants. The chosen modifications - such as scheduling strategic breaks during meal preparation, adjusting portion sizes to the patients' needs, integrating a vocal assistant, and customizing recipes and cognitive strategies - reflect occupational therapists' focus on patient safety, goals, and needs. Participants also accounted for clinical time constraints by choosing the addition of a baseline configuration. Moreover, preliminary data analysis and the F-SUS score (78,33%) suggest a good usability level of COOK's configuration interface considering occupational therapists' efficiency, efficacy and satisfaction when carrying out the configuration process.
Conclusions: This study offered key insights into priority adaptations needed for COOK's configuration interface to better suit occupational therapists' needs. It also provided an initial opportunity for occupational therapists to familiarize themselves with the interface. The findings will guide usability improvements of this interface, enhancing occupational therapists' experience and encouraging greater adoption of COOK in clinical practice.

230 Traumatic Brain Injury due to Intimate Partner Violence: A Case-control Study of Cognitive Functioning Among Women Survivors

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ABSTRACT

Introduction: Intimate partner violence (IPV) most often affects women and has significant consequences on their physical and mental health. Many women survivors of IPV experience traumatic brain injuries (TBIs) and potential hypoxic-ischemic brain injuries due to nonfatal strangulation. Limited prior research has examined cognitive functioning following IPV-related TBI, finding worse performances on tests of executive functions and memory associated with the injury. This study employed a case-control design to compare women survivors of IPV with and without IPV-related TBI on subjective and objective cognitive outcomes, hypothesizing that women with IPV-related TBI would report more cognitive concerns and perform worse on cognitive tests.

Method: Women survivors of IPV were recruited from domestic violence shelters, IPV service organizations, and the local community in Kentucky. Women with 2 or more IPV-related TBIs (n=33; M=36.5±9.4 years-old; 63.6% White) were compared to women survivors without IPV-related TBI history (n=22; M=34.4±10.3 years-old; 77.3% White) on the Neurological Quality-of-Life (Neuro-QoL) Cognitive Function questionnaire, Rey Auditory Verbal Learning Test (RAVLT), and the NIH Toolbox Cognition Battery (NIHTB-CB). Women also completed the Posttraumatic Stress Disorder (PTSD) Checklist-5 (PCL-5) and questions on pain frequency and duration, screening for PTSD and chronic pain, respectively.
Results: Women with repetitive IPV-related TBIs screened positive for elevated cognitive concerns (81.8%) more often that women without IPV-related TBI (50.0%), with a large group difference in severity of cognitive concerns (one-tailed p=.006, d=0.71). Women with IPV-related TBIs performed worse on cognitive tests, with lower scores on RAVLT total learning (Trials 1-5) (p=.045, d=0.47) and delayed memory (p=.034, d=0.51) and reduced fluid cognition on the NIHTB-CB per the Crystallized-Fluid Composite T-score difference (p=.035, d=-0.51). The largest group differences on individual NIHTB-CB tests were observed for executive functions, specifically the Dimensional Change Card Sort (p<.001, d=-1.01). Adjusted analyses controlled for positive PTSD and chronic pain screens as covariates, finding the RAVLT total learning no longer significantly differed between groups (p=.070, partial η^2=0.05), whereas the RAVLT delayed memory (p=.025, partial η^2=0.08), NIHTB-CB Crystallized-Fluid Composite T-Score Difference (p=.012, partial η^2=0.10), and the Dimensional Change Card Sort test score (p<.001, partial η^2=0.24) remained significantly worse among women with repetitive IPV-related TBI.
Discussion: In alignment with our hypothesis, repetitive IPV-related TBIs were associated with greater cognitive concerns and worse objective cognitive test performances. The group differences associated with IPV-related TBI were not fully attributable to comorbid PTSD or chronic pain. These results indicate that women with IPV-related TBIs experience unaddressed cognitive health needs that may benefit from assessment and intervention. These results require replication in larger samples recruited from broader geographical regions with more demographic diversity.

231 If You Want To Go Far, Go Together: A Collaborative Return-to-Work Program For Individuals After ABI

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ABSTRACT

Job loss and insecurity don't just impact financial stability—they strike at the core of health equity. For many individuals with an acquired brain injury (ABI), returning to work is the ultimate goal in recovery. Yet, the path to returning to work is especially challenging, with systemic and attitudinal barriers at every corner. From a lack of understanding from employers and changes in relationships with colleagues to difficulties managing symptoms and mental health challenges, individuals with ABI are often left to traverse this path alone without support. The Ontario Brain Injury Association forged an alternative to the current landscape by developing and evaluating an innovative, first-of-its-kind return-to-work program offered at no cost to employers and individuals with ABI.
Program Overview: The program offers an online training program and access to interdisciplinary support for individuals with ABI and their employers as they navigate the complex process of re-entering the workforce. By supporting individuals with ABI, we aim to improve their overall quality of life by increasing awareness of mental health challenges and building capacity for symptom management. In partnership with their employer, we strive to shatter barriers to create more inclusive workplaces for individuals with invisible disabilities. Our pre-program results underscore the importance of this comprehensive support.
Program Evaluation: The evaluation involved 32 participants, 75% women, predominantly between the ages of 25 to 64. Most participants (97%) had some level of post-secondary education, and most (72%) reported earning more than $50,000 annually. Validated measures to assess overall well-being before their involvement with the program included the Quality of Life after Brain Injury-Overall Scale (M=33.82, SD=18.85) and the Acceptance and Action Questionnaire-Acquired Brain Injury (M=30.06, SD=9.19). Scores from these measures demonstrated that participants reported poor quality of life and low levels of acceptance of their injury pre-program. Participants also completed the Depression, Anxiety and Stress Scale, which indicated participants experience severe depression (M=26.5, SD=11.71), extremely severe anxiety (M=23.25, SD=8.79), and severe stress (M=30.75, SD=9.80). After six months, participants were reassessed and results were compared across three groups. All completed the online training, but the groups differed in access to the interdisciplinary team and employer involvement: Group One completed only the training, Group Two received interdisciplinary services without employer involvement, and Group Three received both interdisciplinary services and employer support.

This session will present an overview of the program, explore client outcomes and the preliminary results on the program's effectiveness. Finally, we will provide the audience with our lessons learned. Attendees will leave the presentation with the foundational knowledge needed to implement the program worldwide, improving return-to-work outcomes for individuals with ABI.

232 Shaping Intergenerational Initiatives For Individuals With Traumatic Brain Injury: A Qualitative Study

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ABSTRACT

Introduction: Individuals aging with a traumatic brain injury (TBI) may face dual stigmatization, ageism and ableism, which can restrict their social participation (SP). SP is associated with a reduced risk of mortality, in addition to being a modifiable determinant of health and successful aging. Interventions supporting SP of individuals aging with TBI remain scarce and poorly documented. It has been shown that intergenerational initiatives improve the health of older adults, support SP, and foster more positive attitudes toward aging. However, none of the studies on intergenerational initiatives have been initiated with the TBI population.

Objectives: (1) Explore the relevance of intergenerational initiatives for individuals aging with TBI; (2) Identify the opportunities and challenges when implementing these initiatives; (3) Identify strategies to evaluate the potential effects of these initiatives.

Methods: This exploratory qualitative study is part of a broader participatory action-research project implementing an intergenerational initiative designed by and for individuals with TBI. Semi-structured interviews (60min) will be conducted with individuals living with TBI (4), community workers working with this population (4) and intergenerational experts (4). An interview guide consisting of 20 questions (including sociodemographic) was co-developed and pretested with the steering committee of the research-action project. A mixed-methods approach based on the Framework Method was used for data analysis. The deductive portion relies on the Consolidated Framework for Implementation Research (CFIR).

Results: A total of eight interviews were conducted (4 individuals with TBI, 2 community workers and 2 experts). Among individuals with TBI (2 women, 2 men, on average 20 years post-TBI), three were aged between 63 and 68 years and one was 28 years old. The intergenerational experts (2 women academics) had 8 years' experience in the field. The community workers (2 women) had been working with the TBI population for an average of 8.5 years. A preliminary analysis revealed unanimous agreement on the relevance of intergenerational initiatives, particularly in breaking the isolation of individuals with TBI. All participants evoked multiple and unique challenges linked to TBI, such as cognitive issues, and therefore the importance of adapting the instructions, and having personalized support from community workers. Individuals with TBI reported the importance of listening to their needs and interests when planning intergenerational initiatives. Experts suggested as an evaluation strategy the combination of qualitative and quantitative measures.

Conclusion: This study enhances the understanding of the opportunities and challenges associated with intergenerational initiatives for the TBI population. It will guide future research aimed at developing initiatives that effectively address the unique needs of this population. By fostering connections between generations, such initiatives aim to reduce ageism and ableism experienced by individuals aging with TBI, ultimately supporting a more inclusive environment.

233 A Scoping Review on Rehabilitation, Traumatic Brain Injury, and the Criminal Justice System

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ABSTRACT

Traumatic brain injury (TBI) is disproportionately prevalent among individuals who intersect with the criminal justice system (CJS). To date, there is limited information on the extent to which rehabilitation is available to, or used by, individuals with TBI who intersect with the criminal justice system. A scoping review was conducted to address this knowledge gap. Electronic databases (MEDLINE, Embase, Cochrane CENTRAL Register of Clinical Trials, CINAHL, APA

PsycINFO, Applied Social Sciences Index and Abstracts, and Proquest Nursing and Allied Health), relevant organizations' websites, and reference lists of eligible articles were systematically searched. Twenty-two peer-reviewed articles and two grey literature reports met the predetermined eligibility criteria. A descriptive numerical summary and qualitative content analysis were conducted to understand the availability and extent of rehabilitation for individuals with TBI who intersect with the CJS. Existing rehabilitation programs are already serving individuals with TBI with a history of CJS involvement. However, TBI and/or CJS are rarely considered or acknowledged in rehabilitation interventions. The following opportunities to advance rehabilitation for individuals with TBI who intersect with the CJS were identified: (a) TBI screening, (b) education on TBI within CJS settings, and (c) linkages to the community to support continuity of care. This review also highlighted an urgent need to integrate sex, gender, and other intersecting factors into research and the rehabilitation process to enable timely and appropriate rehabilitation and continuity of care for diverse individuals with TBI who intersect with the CJS.

234 Diffusion Tensor Imaging and Cognitive Performance Between Long-COVID Patients and those with Normal Recovery

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ABSTRACT

Background: Long-COVID is a heterogeneous disorder with common symptoms including fatigue, anosmia, and brain fog, however, the pathophysiology of long-COVID and long-COVID symptoms is unclear. This study aimed to compare long-COVID patients and individuals who recovered normally from COVID-19 on markers of white matter diffusivity in the brain and scores on objective cognitive testing.

Methods: Long-COVID participants were defined as those who experienced COVID-19 symptoms for more than 60 days post-infection (n=56). Normal recovery participants were those who recovered from COVID-19 within 60 days of infection (n=35). Self-reported information regarding physical and mental health, and COVID-19 illness was collected. The National Institute of Health Toolbox Cognition Battery was administered. Participants underwent magnetic resonance imaging (MRI) with diffusion tensor imaging (DTI). The DTI metrics (fractional anisotropy, axial diffusivity, mean diffusivity, radial diffusivity) were compared using tract-based spatial statistics to perform a whole-brain voxel-wise analysis, controlling for age and sex. Cognitive performance between long-COVID and normal recovery groups was compared using the NIH Toolbox Age-Adjusted Fluid Cognition Scores, covarying for Age-Adjusted Crystallized Cognition Scores and years of education. False discovery rate correction was applied for multiple comparisons.

Results: There were no group differences in age, sex, or history of neurovascular risk factors. The long-COVID group had significantly ($p<0.05$) lower mean diffusivity than the normal recovery group across multiple white matter regions, including the corticospinal tract, corona radiata, corpus callosum, superior and inferior fronto-occiptal fasciculus, and posterior and anterior thalamic radiation. However, the effect sizes of these differences were small (all $\beta<|0.3|$) and there were no significant differences in the other DTI metrics. Fluid cognition composite scores did not differ significantly between the long-COVID and normal recovery groups ($p=0.28$, $\beta=-0.22$ [-0.6, 0.2]). We additionally compared the subgroup of long-COVID patients experiencing ongoing cognitive symptoms (n=20) to our normal recovery group. The long-COVID patients had lower mean diffusivity than the normal recovery group ($p<0.05$), but there was no group difference for the Fluid cognitive composite scores ($p=0.80$, $\beta=-0.1$ [-0.6, 0.5]).

Conclusions: We report lower mean diffusivity in long-COVID compared to normal recovery. These findings may represent subtle areas of pathology such as gliosis but considering the small effect sizes and the non-specific nature of the diffusion indices, it is difficult to make pathological inference. Although long-COVID patients frequently reported neuropsychiatric symptoms, there were no significant differences in objective cognitive performance between long-COVID and normal recovery or between long-COVID patients with ongoing cognitive symptoms and normal recovery.

235 A Scoping Review on Rehabilitation, Traumatic Brain Injury, and Homelessness

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ABSTRACT

Rehabilitation is critical to facilitating recovery after traumatic brain injury (TBI). However, there is currently limited information on rehabilitation among individuals with TBI who experience homelessness. A scoping review was conducted to explore

the extent to which rehabilitation, including the types of rehabilitation interventions, are available to, or used by, individuals experiencing homelessness and TBI. Electronic databases (MEDLINE, Embase, Cochrane CENTRAL Register of Clinical Trials, CINAHL, APA PsycINFO, Applied Social Sciences Index and Abstracts, and Proquest Nursing and Allied Health), grey literature, and peer-reviewed articles that met predetermined eligibility criteria were systematically searched. Qualitative content analysis and a descriptive numerical summary of extracted data were conducted. Fifteen peer-reviewed articles and three grey literature reports described interventions for individuals experiencing homelessness and TBI (N=4), rehabilitation for individuals experiencing homelessness without specific inclusion criteria for TBI (N=11), and rehabilitation interventions without specific inclusion criteria for TBI or homelessness (N=3). The following opportunities to advance rehabilitation for individuals with TBI who experience homelessness were identified: (a) screening for TBI, (b) conducting cognitive and functional assessments, and (c) tailoring interventions with multidisciplinary teams. This review also highlighted an urgent need to provide structured education and training for healthcare professionals regarding TBI and conduct research that considers the rehabilitation needs of diverse individuals experiencing homelessness and TBI.

236 Influencing Public Policy Through Strategic Alignment Across the Neuro Advocacy Communityword

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ABSTRACT

In the United States, healthcare coverage and services provided through the public health systems vary greatly from state to state. Advocates must navigate ways to influence legislators and other public policy influencers in their own state. Through strategically developed communities in Michigan, the advocates for neuro rehabilitation have been able to both move forward public policies to expand services, while also providing a unified response to negative proposals and legislative changes undermining access to care. Strategically aligned communities with this level of influence take years to develop. Regardless, building these networks should be part of any advocacy planning work. In Michigan, providers of post-acute neuro rehabilitation formed a business council in 1987 in response to early signs that the private insurance industry might try to reduce benefits for people injured in automobile crashes. In 1992 and again in 1994, this council was able to help defeat two ballot proposals that would have gravely undermined care. This group, now called the Michigan Brain Injury Provider Council (MBIPC), has matured to become a leading voice in public policy related to post-acute care in Michigan. In the early 2000's, MBIPC realized they would not be able to hold off the influence of the insurance industry alone and began considering ways to strengthen their influence. In 2004, MBIPC initiated the formation of a multi-agency lobbyist group, creating the Coalition Protecting Auto No-Fault (CPAN). The Coalition included key associations that already had long standing relationships with policy makers, including the Michigan Hospital Association, the Michigan Association for Justice, the Disability Rights Coalition and others. This new coalition was successful in protecting neuro rehabilitation in Michigan until 2019 when major legislative changes gutted funding for post-acute care. Once these major changes occurred, the families of those living with brain injuries formed their own grassroots coalition through a Facebook group called We Can't Wait. This group quickly grew to over 8,000 advocates. They formed a very strong and highly visible consumer group and became a key voice to have alongside the providers whenever working on policies impacting care. With the alignment of these three advocacy communities, MBIPC, CPAN, and We Can't Wait, Michigan likely has some of the most well organized and coordinated multi-level state advocacy for post-acute neuro rehabilitation anywhere in the United States. The communities have been able to strategically work together to align their voices and become key constituents on policy initiatives and proposals impacting access to and funding for the neuro rehabilitation continuum of care.

237 Concussion History and Lower Extremity Musculoskeletal Injuries: Does Cognition Mediate the Relationship?

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ABSTRACT

Recent evidence suggests that athletes with a concussion history are at an increased risk of subsequent lower extremity musculoskeletal (LEMSK) injury. Research has also found a potential association between pre-season cognitive performance and injury risk. Whether cognitive performance mediates the relationship between concussion history and subsequent LEMSK has yet to be explored. In this study, we conducted regression and mediation analyses to examine this relationship. Secondary analyses re-ran the same models, but with history of multiple concussions as the predictor, rather than history of a single concussion.

The sample was elite/international-level athletes from a Canadian national sport institute. Pre-season cognitive performance was measured by a computerized battery (Vienna Test System) and included tests of reaction time, sustained attention, inhibition, working memory, and planning ability. Concussion history prior to cognitive testing was documented via self-report in a medical history interview with a sports medicine personnel. Subsequent LEMSK injuries were documented prospectively in an injury surveillance program. Regression models determined the relationships between

concussion history and subsequent LEMSK, concussion history and cognitive performance, and cognitive performance and subsequent LEMSK, prior to conducting mediation analyses that examined whether cognition mediates the relationship between concussion history and subsequent LEMSK. The analyses will also be conducted for history of multiple concussions (0-1 previous concussions vs. 2+ concussions). All models controlled for sex and age as covariates.

The sample included 145 athletes (female = 86; mean age [SD] = 21.50 [4.05], age range: 14.42 to 35.58 years) across six different sports within the concussion management program: artistic swimming, boxing, diving, short-track speed skating, trampoline, and water polo. Concussion history and history of multiple concussions significantly predicted subsequent LEMSK (β = 0.83, p = 0.026; β = 1.18, p = 0.028). Concussion history was also significantly associated with increased errors on an inhibition test (β = 1.13, p = 0.046), faster reaction time on an inhibition test (β = -0.022, p = 0.005), and faster reaction time on a sustained attention task (β = -0.044, p = 0.025). History of multiple concussions was associated with faster detection time (β = -30.40, p = 0.0028). The only cognitive measure that significantly predicted subsequent LEMSK was slower reaction time on a working memory task (β = 2.45, p = 0.029). In mediation analyses, no cognitive measures mediated the relationship between concussion history (or history of multiple concussions) and subsequent LEMSK.

Identifying risk factors for LEMSK injuries is critical for injury prevention. We found that relationships exist between concussion history, pre-season cognitive performance, and subsequent LEMSK, but that cognition does not mediate the relationship between concussion history and subsequent LEMSK. Future research should continue to explore the exact mechanism underlying the relationship between concussion history and injury risk.

238 A Systematic Review on Equity Considerations in Clinical Practice Guidelines for Traumatic Brain Injury and Homelessness

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ABSTRACT

Adherence to clinical practice guidelines (CPGs) for traumatic brain injury (TBI) leads to reduced length of stay in the hospital and improved functional outcomes. However, the extent to which equity is considered in these CPGs is unclear. A systematic review was conducted to assess equity in CPGs for TBI and homelessness. Electronic databases (MEDLINE, Embase, CINAHL, PsycINFO), targeted websites, Google Search, and reference lists of eligible CPGs were systematically searched. Fifty-eight CPGs for TBI and two CPGs for homelessness met the predetermined eligibility criteria. Of the CPGs for TBI, 5.2% integrated evidence regarding homelessness. All the CGPs for homelessness integrated evidence regarding TBI, however, they only acknowledged that TBI is prevalent among individuals experiencing homelessness. Equity was rarely considered in the content and development of the CPGs for TBI – disadvantaged populations were seldom involved among members of the working group and no plans to assess and monitor guideline uptake were included. To improve health services and outcomes, the following opportunities were identified: (a) integrate evidence regarding TBI and homelessness in CPGs to develop recommendations that are appropriate and achievable for individuals experiencing homelessness and TBI, (b) engage underserved populations in all stages of the guideline development to ensure that recommendations are supported by their experiences and reflect and address their needs, and (c) conduct and prioritize equity-driven research focused on, and with underserved populations, to address their repeated exclusion in research and to build the evidence base on TBI and homelessness that can contribute to CPGs.

239 The Boston Exercise Symptom Threshold Test for Mild Traumatic Brain Injury Rehabilitation

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ABSTRACT

Physical exertion tests have been used to assess concussion-related symptoms and guide return-to-play in athletes. However, they can also be used to threshold subsequent exercise intensity during prescribed exercise interventions by determining individual heart rate (HR) at exercise-induced symptom exasperation following mild traumatic brain injury (mTBI). Despite this, current tests provide limited metrics (i.e., no physical fitness data) with no data being published on their efficacy in determining thresholds for subsequent exercise intervention sessions in community-dwelling individuals with mTBI. (i.e., non-sport-related TBI). Therefore, we aim to provide preliminary data on the feasibility of the Boston Exercise Symptom Threshold Test (BESTT) in community-dwelling individuals with mTBI and to test the efficacy of the test on thresholding subsequent aerobic exercise intervention sessions as part of an ongoing pilot randomized control trial (NCT06494592). 24 community-dwelling adults (29.79 ±11 yrs.), physician-diagnosed with mTBI within 12 months

of initial injury, completed a three-phase test on a cycle ergometer. Phase one involves a seven-minute warm-up with no restrictions, or resistance. Phase two involves a six-minute sub-maximal cardiorespiratory fitness test (Modified Astrand Rhyming Cycle Test) followed by progressive increases in cadence and resistance (Phase three) until stopping criteria is reached (≥ three-unit increase in symptom severity or safety/volitional exhaustion). HR and symptom severity were collected every two minutes. HR at individualized symptom threshold (the point at which a ≥ three-unit exercise-induced symptom severity increase from baseline is observed) is then calculated and used to threshold 30-minute aerobic exercise sessions delivered three-times per week. No adverse events were reported during the test nor any of the subsequent exercise intervention sessions. All 24 participants completed phase one of the BESTT allowing for the estimation of cardiorespiratory fitness. 45.8% of participants ended the BESTT due to reaching symptom threshold, 37.5% were due to exhaustion, and 16.7% were due to reaching their age-predicted max HR. On average, the test lasted 9.56±3.24 minutes. Data from the first two-weeks of aerobic exercise intervention showed that 91.6% of participants exercised within, or above, 65 – 80% of their symptom threshold without experiencing symptom exasperation. Linear mixed effects modeling involving ratings of perceived exertion (RPE), HR, and time revealed a significant effect of HR ($\beta = 0.038$, $p < 0.001$, CI = 0.018 – 0.058) and timepoint ($\beta = 1.023$, $p =< 0.001$, CI = 0.780 – 1.265) on RPE. Meaning, as HR increased, RPE also increased over time. The BESTT is a feasible physical exertion test for community-dwelling individuals and provides accurate information that allows prescribers to threshold aerobic exercise sessions that do not increase mTBI-related symptoms. Thresholding exercise-induced symptoms through a systematic test, like the BESTT, will allow 'exercise is medicine' interventions to reach more individuals recovering from mTBI, beyond sport-related concussion populations.

240 A Systematic Review on Equity Considerations in Clinical Practice Guidelines for Traumatic Brain Injury and Criminal Justice System

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ABSTRACT

Clinical practice guidelines (CGPs) – designed to guide care – tend to overlook equity and disadvantaged groups and instead, focus on the effectiveness or cost-effectiveness of care. As a first step to improving equitable care, a systematic review was conducted to explore how (1) evidence regarding individuals who intersect with the criminal justice system (CJS) is include in CPGs for TBI and evidence regarding TBI is integrated in CPGs for CJS and (2) equity is considered in CPGs for CJS. Electronic databases (MEDLINE, Embase, CINAHL, PsycINFO), targeted websites, Google search, and reference lists for CPGs for TBI and CPGs for CJS were systematically searched. Fifty-seven CPGs for TBI and six CPGs for CJS were included in this review. Of the CGPs for TBI, 14 included information relevant to the CJS, however, only 1 provided a concrete recommendation to consider legal implications during vocational evaluation in the forensic context. Of the CPGs for CJS, two acknowledged the prevalence of TBI and one specifically recommended considering TBI during health assessments. There was limited consideration for equity in CPGs for CJS. The following recommendations were identified from this review to enhance equity in healthcare for this population: (a) conduct research, including investigating the process of screening for TBI in individuals who are involved with the CJS and (b) use equity assessment tools in guideline development.

241 Integrated Care for Traumatic Brain Injury and Mental Health and Substance Use: A Systematic Review

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ABSTRACT

Traumatic brain injury (TBI) and mental health and substance use (MHSU) are global public health concerns. Many individuals with TBI also experience a MHSU and many individuals with MHSU have also sustained a TBI. However, there is currently limited information on integrated care for TBI and MHSU. This systematic review summarized existing integrated care for individuals with TBI and MHSU and identified

barriers and facilitators to integrated care. Electronic databases (MEDLINE, EMBASE, PsycINFO, CINAHL, Cochrane Central Register of Controlled Trials, Sociological Abstracts, and Dissertations & Theses Global) were systematically searched and a narrative synthesis was conducted. Fifty-nine peer-reviewed articles were identified, of which 49 described treatments, 4 described programs, and 7 described screening activities. Clinical integration at the micro- (N=38) and meso-levels (N=10), service integration at the micro- (n=6) and meso-levels (n=5), and functional integration at the meso-level (N=1) were identified. Few articles reported on facilitators and/or barriers related to integrated care. This review provided evidence that integrated care for TBI and MHSU already exists. The following opportunities to facilitate the integration of TBI and MHSU care were identified: (a) integrating accommodations to address cognitive challenges experienced by individuals with TBI, (b) multidisciplinary teams to improve patient outcomes by addressing other sequelae of TBI and MHSU, (c) supporting caregivers by addressing transportation barriers, and (d) promoting education among health professionals so they can be familiar with TBI and MHSU.

242 A Cross-Sectional Study on Social Determinants of Health Associated with Psychological Distress Stratified by Lifetime History of Traumatic Brain Injury and Sex

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ABSTRACT

Mental health challenges are common among individuals with traumatic brain injury (TBI). However, gaps in healthcare and supports cross the continuum of care persist for this population. There is also limited information on social determinants of health (SDoH) associated with mental health challenges. This study identified the SDoH associated with psychological distress in adults with and without a self-reported history of TBI, stratified by sex. Data from the 2014-2017 cycles of the Centre for Addiction and Mental Health Monitory Survey were analyzed. This is a telephone survey representative of adults 18 years or older in Ontario, Canada. The six-item version of the Kessler Psychological Distress Scale was used to identify individuals with a self-reported moderate to severe psychological distress. Self-reported TBI was determined by asking whether participants experienced a head injury resulting in a loss of consciousness for 5 minutes or longer, or at least one night stay in the hospital. Of 7,214 participants, 16.4% of individuals self-reported experiencing a TBI. Among individuals who reported a history of TBI, 30.2% of males and 40.1% of females reported experiencing psychological distress (p=0.0109). Among individuals who did not report experiencing a TBI, 17.9% of males and 23.5% of females reported experiencing psychological distress ($p < 0.0001$). Multivariable logistic regression analyses were conducted and showed that SDoH associated with psychological distress were similar between individuals with and without a history of TBI: unemployment among both males and females; income below the provincial median and older age among males; and rural residence among females. This study highlights the need to identify and address psychological distress, particularly among individuals with TBI, so post-injury care considers the potential impact of psychological distress on treatment choice, adherence, and outcomes. Findings also suggest that adaptations to existing population-level mental health services and supports may be opportunities to support individuals with TBI.

244 Influence of Social Determinants of Health on Pediatric Concussion Recovery: A Retrospective Analysis of Clinical Outcomes and Follow-up Adherence

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ABSTRACT

Background: Although preliminary studies have identified disparities in healthcare utilization, care adherence, and recovery among racial/ethnic minorities with sport-related concussion, the influence of broader social determinants of health (SDOH) on concussion outcomes remains underexplored. Utilizing proxy measures like the Child Opportunity Index (COI), which quantifies socioeconomic factors from United States Census Tracts, provides a method to assess the impact of SDOH on healthcare outcomes. This study aimed to investigate the association between the COI and access to care, recovery duration, and follow-up adherence in pediatric concussion.

Methods: A retrospective cohort study was conducted using data from a US-based pediatric academic medical center sports medicine program. Participants included children and adolescents (N = 1414; mean age = 14.53, SD = 2.82, 40% female) stratified by COI. We examined the time from injury to initial clinic visit, time from injury to asymptomatic clinic encounter, and clinic follow-up adherence (lost to follow up: yes/no). Univariate analysis of variance and chi square analyses were

used to assess the impact of COI on these outcomes, with statistical significance set at $p < .05$. Analyses included data from participants whose time to initial clinic encounter and recovery duration (where available) fell within 2 standard deviations of the sample mean.
Results: Our findings indicated significant variations in the time from injury to initial clinic visit among the different COI levels ($F(3, 1410) = 2.94$, $p = .032$), with patients from the "Very High" COI level experiencing significantly shorter delays in seeking care (Mean = 4.58 days, SD = 4.15) compared with patients from the "Very Low" COI level ($p = .003$, Cohen's $d = 0.27$). However, no significant differences in recovery duration were found across COI levels ($F(3, 1294) = 0.178$, $p = .912$), indicating that SDOH index level had minimal impact on these timelines (mean days = 18.86, SD = 13.42). Chi-square analyses revealed a significant association between COI level and clinic follow-up adherence ($\chi^2(3, N=1414) = 12.61$, $p = .006$, Cramer's $V = 0.09$), showing that of those lost to follow up, the "Very Low" COI group had a higher percentage (35%) compared with the "Very High" COI group (8%).
Conclusions: Findings demonstrate the influence of SDOH, as measured by the COI, on healthcare access and follow-up adherence in pediatric concussion recovery. Patients from lower-opportunity areas experience delays in accessing care and are at greater risk of being lost to follow-up compared to those from higher-opportunity areas. While COI may not fully capture the nuances of individual SDOH, it serves as a useful starting point. These results underscore the need for targeted interventions and policies to address systemic barriers to ensure equitable care and improve outcomes for all children recovering from concussion.

245 Defining and Assessing Severe Aphasia: Why, How, and Now What?

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ABSTRACT

Research within aphasiology, speech-language pathology (SLP), and other rehabilitation fields often excludes people with severe aphasia (Brady et al., 2013; Hilari & Byng, 2009). Additional challenges arise from a lack of clarity in defining "severe aphasia," as well as a lack of consensus regarding the best protocols to assess language and cognitive functions in this population. Consequently, the empirical literature examining the evaluation and treatment of people with severe aphasia lags behind reports of individuals with mild to moderate aphasia. Therefore, many aphasia research findings and clinical recommendations may not apply to those with severe aphasia (e.g., Edmonds & Babb, 2011; Salis et al., 2021). Improved inclusion of people with severe aphasia may require a better understanding of how it is defined and assessed in the current literature. Accordingly, we present results of a state-of-the-art scoping review of the literature addressing the following questions: (1) How is "severe aphasia" defined in the extant literature? (2) What are the current practices for evaluating and quantifying language, cognition, functional communication, and quality of life in people with severe aphasia? 2a. What tools have been used to identify strengths, weaknesses, and strategies for communication? 2b. How do the assessment tools used in contemporary extant literature represent the levels of the World Health Organization International Classification of Functioning, Disability and Health (WHO, 2018) and/or Living with Aphasia: Framework for Outcome Measurement (Kagan et al., 2008)? 2c. What are the psychometric strengths of current assessment tools for severe aphasia? 2d. How have these assessment tools been used to capture change? METHODS: Seven electronic databases were searched for articles published from January 1, 2010, to December 15, 2023. Results were documented using the PRISMA for Scoping Reviews guidelines (Tricco et al., 2018). We included studies that specifically reported participants with severe aphasia; described, defined and/or quantified in any way; using any formal or informal assessment tool(s) in any setting (e.g., medical, rehabilitation). RESULTS AND DISCUSSION: Following duplicate removal, 7,040 studies were title/abstract screened, 1,675 full text screened, and a total of 597 papers included for data extraction. Initial results demonstrate that the definition, description, and assessment of severe aphasia is often not clearly stipulated and varies widely within the aphasia and broader medical literature, particularly across different disciplines (e.g., medicine, psychology, SLP). Delineation of current definitions and practices for evaluating and quantifying language, cognition, functional communication strengths, and quality of life in severe aphasia will be discussed along with a review of clinical implications.

246 Ready Assessment of Diagnostics and Prognostics (RAPID) for Concussion: Preliminary Analysis of Blood Biomarkers and Persistent Post-Concussion Symptoms

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ABSTRACT

Introduction: Most adults recover from a concussion within 4 weeks of injury, however, up to 30% experience symptoms beyond 1 month, termed persistent post-concussive symptoms (PPCS). Predicting recovery after concussion remains a high-priority research area, and currently, there is no accurate, quantitative prediction tool for concussion recovery in adults. Multiple fluid biomarkers of central nervous system injury have demonstrated potential as prognostic biomarkers for recovery following concussion. Specifically, glial fibrillary

acidic protein (GFAP), a marker of astroglial reactivity, and Neurofilament light (NfL), a marker of axonal damage, are promising biomarkers in the brain injury literature. The primary objective of this pilot study was to evaluate the utility of plasma GFAP and NfL measured acutely post-concussion in relationship to PPCS at 4 weeks post-injury. The secondary objective was to compare plasma concentrations of GFAP and NfL in adults with concussion to matched musculoskeletal injury (MSK) controls.
Methods: Adults (18-65 years) with physician-diagnosed concussion (ACRM 2023 definition) and age- and sex-matched MSK controls were recruited from the Foothills Medical Centre Emergency Department (ED; Calgary, Alberta). Blood samples were collected in the ED at the initial visit (0-2 days post-injury). Plasma NfL and GFAP were analyzed using Meso Scale Diagnostics S-Plex Neurology Panel 1 Cat# K15639 assay (Rockville, Maryland, US). Participants with concussion were followed up to 4 weeks post-injury at which time they were categorized as recovered or experiencing PPCS (≥ 3 symptoms on the Post-Concussion Symptom Checklist and/or < 95% subjective recovery). Mann-Whitney U-tests were used to compare plasma protein levels between groups. Spearman Rank correlations were used to examine the relationship between initial plasma levels of GFAP and NfL and days to recovery.
Results: This preliminary sample included 20 participants (10 concussion [39.1±13.0 years, 0.4±0.5 days post-injury]; 10 MSK [38.8±13.3 years, 0.3±0.5 days post-injury], 50% female). There were no differences in initial post-injury GFAP (U=32.0, p=0.190) or NfL (U=36.0, p=0.315) levels between adults with concussion and MSK controls. At 4 weeks post-injury, 3 participants with concussion had recovered, 4 had PPCS, and 3 were lost to follow-up. Plasma NfL levels were significantly higher in those with PPCS than those who recovered by 4 weeks post-injury and significantly correlated with days to recovery (r=0.829, p=0.042). Plasma GFAP did not differ by recovery groups at 4 weeks post-injury (U=5.0, p=0.724) or correlate to days to recovery (r=-0.371, p=0.468).
Conclusions: This preliminary analysis found acute plasma NfL levels were higher in concussed participants who developed PPCS than those who recovered by 4 weeks and correlated to time to symptom recovery, suggesting that NfL might have potential as a prognostic biomarker of PPCS in adults. Further research with a larger sample size is necessary to validate these results.

247 A Case Report of Fentanyl Overdose Anoxic Brain Injury With Post Anoxic Confusional State Responding To Zolpidem

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ABSTRACT

Background: Anoxic brain injury (ABI) can have a variety of causes with devastating consequences for those that survive the initial insult. Many ABI survivors suffer a subsequent disorder of consciousness (DOC), representing a significant emotional and financial cost for themselves and their caregivers. Much of the literature regarding ABI surrounds cardiac arrest in the hospital setting. However, there is a rising number of drug overdose events occurring outside of hospitals, with fentanyl outpacing all other drugs 1, 2. There is a need for clinicians to investigate and document novel methods of improving functional standards of living within this growing cohort. Zolpidem is a nonbenzodiazepine hypnotic that selectively binds GABA-v1 receptors within the brain, producing effects that can be observed clinically and with imaging. Much of the current body of knowledge represents patients with severe DOC including those with traumatic brain injury. This report details clinically a novel use of zolpidem in an ABI patient with a state of consciousness on the spectrum of DOC consistent with Post Traumatic Confusional State (PTCS) or in this case Post Anoxic Confusional State (PACS).
Case: 38-year-old male with opiate associated outside hospital cardiac arrest causing ABI was admitted to acute inpatient rehabilitation 183 days after his injury at a Rancho VI level. He was dependent in all activities of daily living, with impaired orientation, attention, short-term recall, insight, social pragmatics, inconsistent object use, and unreliable communication. In two weeks of therapies, he remained at a maximum assist level. Thorough workup revealed no organic etiology and he was determined to be in PACS. The patient had no response to amantadine 200 mg daily and made minimal progress for two weeks while in acute inpatient rehabilitation, until zolpidem 5 mg was trialed. This resulted in improved attention, ability to engage verbally, decreased disinhibition, reduced agitation, and meaningful communication and object use. He progressed to supervised Activities of Daily Living (ADL's) and mobility levels while taking zolpidem with abrupt improvement in Saint

Louis University Mental Status Exam (SLUMS) score initial 12, improved to 20/30, Galveston Orientation and Amnesia Test (GOAT) score initial 12, improved to 70, and Supervision Rating Scale (SRS) initially 13 requiring restraints with enclosure bed to a 10 requiring indirect supervision, and Glasgow Outcome Scale Extended (GOSE) 3 to a 4.
Conclusion: After ABI this patient demonstrated signs of a DOC most consistent with the Post Anoxic Confusional State. The patient had little improvement in his functional independence or cognition until zolpidem was introduced, at which point he progressed to a supervision level in ADL's and mobility and improved across multiple metrics. This case represents a novel use of zolpidem in the Post Anoxic Confusional State, in an individual with fentanyl overdose.

248 Assessing the Relationship between Chronic Pain and Cognition: A NIDILRR and VA TBI Model Systems Collaborative Project

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ABSTRACT

Evidence indicates over 50% of individuals with moderate to severe traumatic brain injury (TBI) experience chronic pain that may impact physical and cognitive function and quality of life. The complex relationship that exists between cognition and pain in adults with TBI requires nuanced treatment and interventions. The objective of this study was to investigate the associations between current chronic pain, including pain intensity and interference, and cognition and current chronic head pain and cognition in individuals with moderate to severe TBI. The study was a secondary analysis of a project entitled "The Characterization and Treatment of Chronic Pain after Moderate to Severe Traumatic Brain Injury" (CPS), which was a multi-center, cross-sectional observational cohort study. Individuals were enrolled from the Traumatic Brain Injury Model Systems (TBIMS) longitudinal study, and were eligible if they independently completed one of the routine follow up interviews at years 1, 2, 5, and every 5 years thereafter in English. The final sample included 1762 participants who endorsed experiencing current chronic pain and who completed the Current Chronic Pain survey. The primary outcome measure used was the Brief Test of Adult Cognition by Telephone (BTACT) to assess cognition at the time of follow up, and measures for pain characteristics included the Brief Pain Inventory (BPI) and the Headache Impact Test (HIT-6). Results showed that individuals with TBI who reported current chronic pain exhibited lower cognitive performance compared to those who reported no pain. Among individuals who reported pain, greater pain intensity and pain interference were negatively associated with cognition, resulting in poorer cognitive performance. The BTACT scores decreased between 0.10 and 0.14 standard deviations for every one-point increase in pain intensity, and between 0.07 and 0.10 standard deviations for every one-point increase in pain interference. The negative association was even greater for individuals acknowledging chronic head pain compared to pain from other body locations. For every one-point increase on the HIT-6, BTACT scores decreased by 0.02 standard deviations. In conclusion, the negative association between current chronic pain and cognition for adults with TBI indicates the need to consider pain intensity and pain interference as factors possibly influencing cognitive ability. The findings suggest that pain management should be clinically addressed as a part of cognitive rehabilitation after TBI.

249 Fall-related Traumatic Brain Injury in Young Children: What do we know?

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ABSTRACT

This presentation will describe child and adult actions that preceded fall-related traumatic brain injuries (TBI) in young children, chronicle what happens to infants when they fall and sustain a TBI, and report types of assessments to consider for children in the youngest age group.
Previous research has demonstrated that children aged 0–4 years have the most emergency department (ED) visits for TBI among all pediatric age groups, with falls being the leading cause of this injury. Infants younger than 2 years of age are more likely than other age groups to sustain a fractured skull injury after a fall. Child actions (e.g., running) account for the greatest proportion of injuries overall, but actions by others (e.g., carrying) are commonly the cause of skull fractures in children younger than 1 year of age. Examining the circumstances of these head injuries, especially in infants and young children who are unable to provide a report of what happened, is important.
Fall-related TBI in the 0–4-year age group coincides with reaching developmental stages, such as independent mobility and exploratory behavior, at a time when children may not have developed awareness and avoidance of hazards. In particular, children ages 1-2 years are beginning to have independent mobility, which can account for a higher rate of falls in this age group. Environmental modifications, such as modifications of physical space to control access to hazards, like gates, along with improved parental supervision in the home, can contribute to prevention of unintentional falls. Prevention efforts focused on both developmental and parental factors can be considered.
Fall-related traumatic brain injury in young children places them at risk for effects from TBI across development, including behavioral, learning, and social participation. These injuries are a health and developmental concern for young children, highlighting the importance of a comprehensive

assessment at the time of the injury to better understand adult actions. Further consideration of child development, parental supervision, and the child's environment are all important when understanding young children's falls and designing prevention efforts.

250 A Case Report Demonstrating The Utility of Hyperselective Neurectomy in Lower Extremity Task-Specific Dystonia

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ABSTRACT

Background: Lower extremity task-specific dystonia is a rare form of focal dystonia characterized by involuntary, sustained muscle contractions that occurs during specific activities, such as walking or stair climbing. Unlike other dystonias, which may present during rest, task-specific dystonia only manifests during the performance of precise, repetitive tasks. The condition can significantly impair mobility and quality of life, as the abnormal muscle contractions disrupt normal motor function. Conventional treatments, including botulinum toxin injections, physical therapy, and nerve blocks, often provide limited relief, necessitating novel therapeutic approaches for more refractory cases. This report presents a case of refractory task-specific dystonia treated successfully with hyper selective neurectomy after multiple failed therapies.

Case: A 56-year-old male presented with left upper extremity tremor and progressive dystonia of the left lower extremity, which began subtly over several years after a prior right caudate nucleus stroke. The dystonia manifested as foot flexion and ankle inversion during ambulation with inability to achieve plantigrade in stance phase during gait. There were no symptoms at rest and physical examination demonstrated normal tone with full active and passive range of motion as well as 4/5 strength in plantar flexion, dorsiflexion, and inversion. Electromyography confirmed left lower extremity dystonia with no upper extremity involvement or cortical myoclonus. With a concurrent diagnosis of parkinsonism, the patient's left upper extremity tremor responded to Sinemet, but the dystonia did not improve with dopamine therapy. Conventional treatments, including physical therapy, an ankle-foot orthosis, and botulinum toxin injections failed to provide significant relief. Phenol denervation targeting the tibial nerve at the knee and tibial nerve branches within the proximal leg also produced no change in the pattern or severity of the dystonia. Given the lack of response, a multidisciplinary team, including specialists in neurology, physical medicine and rehabilitation, and orthopedic surgery, evaluated the patient, and decided to perform a hyperselective neurectomy. The procedure involved selective denervation of the terminal motor rami within the medial and lateral gastrocnemius, soleus, and posterior tibialis muscles. Postoperatively, the patient demonstrated marked improvement in dystonia, with significant resolution of ankle inversion and toe flexion during walking. The patient's gait and overall quality of life improved, with no reported adverse effects or motor sensory impairment.

Conclusion: This case is among the first that highlights the potential role of hyperselective neurectomy in treating refractory task-specific lower extremity dystonia. While botulinum toxin injections, phenol nerve blocks and even deep brain stimulator implantation are often used, hyperselective neurectomy offers a targeted surgical solution that preserves motor function. A multidisciplinary approach is critical in such complex cases, providing a path for more personalized treatment options. Further research is needed to evaluate the long-term efficacy of this surgical intervention in Lower extremity task specific dystonia.

251 Gabapentin Use Incidentally Unmasks and Treats Post-Traumatic Seizures in Severe Traumatic Brain Injury: A Case Report

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ABSTRACT

Case Description: A 29 year-old female with no significant medical history was rear-ended by a truck as an unrestrained driver. She sustained bilateral intracerebral hemorrhages with leftward midline shift and uncal herniation and underwent a right hemicraniectomy. She was discharged to a long-term care facility (LTAC) for 11 weeks followed by transfer to an acute inpatient rehabilitation facility (IRF). Course in IRF was significant for left-sided pain and spasticity. Gabapentin, tizanidine, and baclofen were continued from LTAC and chemoneurolysis and chemodenervation performed in the left upper and lower extremities. Pain and spasticity improved over time and five months after the initial injury, the patient was medically stable and the decision was made to down-titrate gabapentin with the goal of minimizing polypharmacy and daytime sedation. Seven days after decreasing gabapentin from 800mg to 600mg three times daily (TID), the patient had a new episode of unresponsiveness with left gaze deviation that resolved with diazepam. After unremarkable work-up including bloodwork and brain imaging, this was determined to be an unprovoked seizure. There were no prior seizures documented or observed in this patient. As gabapentin was the only anti-epileptic drug (AED) in use and the only recent relevant medication modification, its dose was increased back to 800mg TID. No seizures were observed afterwards. Electroencephalogram was performed upon resumption of gabapentin 800mg TID and no epileptiform discharges were identified.

Discussion: One labeled indication of gabapentin is adjunctive therapy for partial seizure treatment. Although technically an AED that reduces excitatory synaptogenesis, gabapentin lacks literature assessing its impact on management of post-traumatic seizures (PTS) in the modern clinical setting. Animal models previously demonstrated decreased rates of PTS with gabapentin use and a study in 2024 reported use of

gabapentin was more frequently observed in patients without PTS compared to patients who had PTS. In this patient with traumatic brain injury (TBI), gabapentin was not started for seizures but appeared to incidentally help prevent PTS; no other AEDs were used. Even without a history of prior PTS, decreasing gabapentin after prolonged use in patients post-TBI may have the potential to lower seizure threshold. The IRF setting notably offers a controlled environment that is conducive to monitoring for and managing any seizure activity that may occur during the process of gabapentin down-titration.
Conclusions: Patients with TBI are often started and maintained on gabapentin for various reasons post-injury. When attempting to wean off gabapentin in the subacute to chronic recovery period, it is advisable to do so gradually and monitor for potential concurrent development or worsening of seizures. Gabapentin use may help prevent PTS and its efficacy as adjunctive treatment or potential monotherapy should be clarified. Further studies are needed to assess the impact of gabapentin on PTS.

252 Unmasking Brain Injury: Using Art to Navigate Emotional Experiences in Acquired Brain Injury

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ABSTRACT

Background: Acquired brain injury (ABI) can affect functioning and quality of life through a wide range of consequences. For example, people may experience changes in sensory, physical, cognitive, communication, language, and personality and behavior domains. Given the potential for these effects to be long-lasting, emotional reactions are common. A loss or deficit in previous modalities of self-expression, such as comprehension, expression, or attention and recall, can create a sense of disconnection from others and strain existing relationships. Visual art is a powerful modality of expression that supports individuals in describing their thoughts and emotions in tangible forms. Art provides an avenue to relay abstract concepts and feelings that are difficult to convey with words or exist beyond linguistic abilities. The Unmasking Brain Injury Project harnessed a method and protocol for sharing and displaying the experience of ABI by creating masks, which are three-dimensional face coverings or representations. Artists use different techniques to decorate and personalize masks, resulting in various designs. Masks can carry symbolic meaning and convey emotions, characters, or stories.
Methods: Given the widely used format of mask-making for brain injury awareness and advocacy, this phenomenological qualitative study explored how people with ABI used art and design related to emotions and prompts in the Unmasking Brain Injury protocol. The publicly available digital catalog of photos of masks and accompanying descriptions created by people with ABI was used in this evaluation (n=1049). Hybrid inductive/deductive reflective thematic analysis was used to evaluate mask-making patterns and their relationship to identified emotions and colors.
Results: Colors and their associated meanings were matched mainly to the identified emotions (87%) in the Unmasking Brain Injury Protocol. However, many narratives elaborated on how or why the emotion was experienced. Narratives were then inductively evaluated to identify elements related to the emotion represented. Seventy-one percent of masks expressed pain or loss; 45% displayed a multiplicity of experiences (positive and negative), and 21.6% presented positivity or purpose as a prominent emotional experience.
Discussion: People with ABI used visual art to display many emotions, including the struggle of ambiguous loss and using purpose and positivity to cope. Visual art may be well posited as a medium for expressing complex or intangible emotions or experiences, as it doesn't rely solely on language for expression and can be expanded upon given a simple prompt. Clinical applications can include mask-making to identify an individual's perspective of the consequences and long-term outcomes of their ABI. This presentation will include clinical experience setting up, prompting, and supporting an Unmasking Event and using masks in brain injury awareness, advocacy, and survivor-focused perspectives.

253 Prevalence, Correlates, and Functional Impact of Somatic Symptom Disorder after Concussion

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ABSTRACT

Somatic symptom disorder (SSD), a neuropsychiatric condition characterized by distress about physical symptoms, may

be common following concussion but has not been previously investigated. In a secondary analysis of data from a cluster randomized trial (Clinicaltrials.gov #NCT04704037), we examined the prevalence, correlates, and functional impact of SSD after concussion.
Methods: 477 adults (44% male, M=39 years old, 61% White) were recruited from emergency departments and urgent care centres in the Greater Vancouver Area, Canada. Participants completed ratings of post-concussion symptoms (Rivermead Postconcussion Symptoms Questionnaire; RPQ), bodily pain (Brief Pain Questionnaire; BPQ), depression (Patient Health Questionniare-9; PHQ-9), anxiety (Generalized Anxiety Disorder-7; GAD-7), disability (World Health Organization Disability Assessment Schedule; WHODAS), and Criterion B symptoms of SSD (Somatic Symptom Disorder-12; SSD-12) at 6-months post-injury. SSD was operationalized as persistent symptoms that interfered with daily functioning and an SSD-12 total score >=16. Depression and anxiety disorder diagnoses at 6 months post-injury were derived from the Mini International Neuropsychiatric Interview for Diagnostic and Statistical Manual of Mental Disorders-5.
Results: At 6 months post-injury, 27.3% (n=130) of participants met our definition of SSD. Participants with SSD reported greater post-concussion symptoms (RPQ; W=4846, p<.0001), chronic pain (BPQ; W=7951, p<.0001), depression (PHQ-9; W=6755, p<.0001), and anxiety (GAD-7; W=7068, p<.0001) than those without SSD. Participants with SSD were also more likely to have comorbid Major Depressive Disorder (OR=9.11, 95% CI=5.27-16.22) and at least one anxiety disorder (OR=5.59, 95% CI=3.60-8.75). A generalized linear model including both post-concussion symptoms (RPQ) and SSD symptom severity (SSD-12) provided a better fit for predicting functional disability (WHODAS) than a model with RPQ alone (ΔDeviance=0.217, p<.0001). Both RPQ (b=0.013, SE=0.001, t=11.08, p<.0001) and SSD-12 (b=0.012, SE=0.002, t=7.26, p<.0001) were significant predictors.
Conclusions: People with SSD after concussion have a greater burden of global post-concussion symptoms, pain, and mood dysregulation, and are more likely to have a comorbid mood and/or anxiety disorder(s), compared to those without SSD. Maladaptive thoughts, feelings, and behaviors related to symptoms (i.e., Criterion B symptoms of SSD) may contribute to disability over and above symptom severity. Assessing for SSD in adults with persisting symptoms after concussion could help direct care to psychological distress, and in turn, improve functional outcomes.

254 Alignment of Person-Centered Goals and Self-Reported Participation on Military Service Members and Veterans with Mild Traumatic Brain Injury

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ABSTRACT

Background: An estimated 20-30% of people who sustain mild traumatic brain injury (mTBI) experience persistent symptoms requiring neurorehabilitation. This rehabilitation often focuses on reduction of impairment and improvement in abilities with the ultimate aim of increasing meaningful participation in desired activities. Changes in participation may be measured through self-report, either using published tools or procedures. This study investigated alignment between participation described by a standardized self-reported measure and person-centered goals elicited through motivational interviewing in military service members and Veterans (SM/Vs) with mTBI.
Methods: In this retrospective chart review study participation data were extracted from medical records of 94 SM/Vs with a history of persistent mTBI symptoms (injury onset at least 6 months prior). Primary outcomes were domain scores from the Participation Assessment with Recombined Tools – Objective (PART-O) and person-centered goals elicited through motivational interviewing administered at the time of evaluation for admission to an interdisciplinary intensive outpatient rehabilitation program. Each participant could have up to three goals. Goals were coded deductively into PART-O domains of productivity, out and about, and social relations. Two members of the study team first separately coded the goals and conflicts were resolved through consensus discussion with a third rater. A linear regression controlling for demographic and injury factors was used to examine the relationship between PART-O domains and person-centered goals.
Results: Participants reported the greatest frequency of participation in the Social Relations PART-O domain score (M = 2.58, SD = 0.84) followed by Productivity (M = 1.95, SD = 1.00) and then Out and About (M = 1.35, SD = 0.62) domain scores. PART-O domains were represented on half (50%) of the 191 person-centered goals set by participants, although three quarters of participants (74%) set at least one goal that could be coded into one of the PART-O domains. The Productivity domain was represented in 18.85% of the goals, Out and About was represented in 10.99% and Social Relations was represented in 19.90%. PART-O domain scores at program admission did not predict person-centered goal categories. Standardized coefficients ranged from -0.29 to 0.12 with no p value less than 0.12 and all confidence intervals included 0.
Conclusions: Participation is important to military SM/Vs with persistent mTBI symptoms but is difficult to measure and may vary greatly across individuals. Results here suggest that convergent methods to understand current participation and desire for change are necessary to guide neurorehabilitation. In particular, evaluating person-centered goals adjunctively when interpreting participation scores derived from standardized measures may add deeper context and support holistic models of care that promote meaningful participation outcomes.

255 Electrical and Hemodynamic Brain Activity of Healthy Subjects and Patients with Disorders of Consciousness During Motor Imagery

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ABSTRACT

Introduction: Disorders of consciousness (DoC) refer to a range of conditions where awareness is impaired due to brain injury, including unresponsive wakefulness syndrome (UWS), where patients are awake but lack signs of awareness, and the minimally conscious state (MCS), where awareness is inconsistent but detectable. The neurobehavioral condition of these patients is commonly assessed using clinical scales that primarily depend on motor responses to stimuli, which can lead to a high rate of misdiagnosis. To enhance diagnostic accuracy, neuroimaging techniques have been proposed, analyzing patients' brain responses to various stimuli and tasks, such as motor imagery, where patients imagine performing a movement. While neuroimaging techniques tend to be expensive and less accessible, electroencephalography (EEG) offers a more affordable, portable, and widely available option for examining brain activity in DoC patients, prompting its increased use in research. Functional near-infrared spectroscopy (fNIRS) shares the cost and portability advantages of EEG and can provide complementary information, though it has been less explored in DoC research. The aim of this study was to investigate using machine learning techniques the brain responses of patients with DoC, including EEG and fNIRS, to a motor imagery task.

Methods: A total of 27 healthy controls and 8 DoC patients (5 UWS and 3 MCS) participated in an ongoing study. Each participant engaged in a 12-minute task consisting of alternating 20-second blocks of motor imagery, during which they were instructed to imagine opening and closing both hands, followed by 20-second rest blocks. Neural activity was simultaneously recorded using a 32-channel LiveAmp EEG headset (BrainProducts, Gilching, Germany) and a 20-channel NirSport2 fNIRS system (NIRx, Berlin, Germany). Separate machine learning classifiers were trained for each data modality to assess the reliability of distinguishing between the imagined motor task and rest periods.

Results: The accuracy of the classification for both techniques was consistent with the level of consciousness. The EEG classifier achieved significant accuracies (>63%) for all healthy controls (85.04±9.93), and all healthy subjects but one showed significant results in the fNIRS classification (82.21±10.53). The average accuracy of the EEG classifiers for MCS patients (71.56±16.93) was higher than for UWS patients (56.67 ±12.96), and a similar pattern was observed with the fNIRS classifier, as MCS patients (60.18±12.96) outperformed UWS patients (50.50±12.96).

Conclusions: The EEG and fNIRS responses of healthy subjects and DoC patients during a motor imagery task were consistent with the level of consciousness. This results provide preliminary evidence of the potential of these techniques to improve diagnosis in DoC.

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256 Mentor Yng. A Peer- Mentor Educational Program for Youth with Acquired Brain Injury (ABI).

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ABSTRACT

Peer support is key to promote independence, inclusion, and participation according to The United Nations Convention on the Rights of Persons with Disabilities. Acquired brain injury (ABI) impairments may be severe, persistent, sometimes lifelong, and affect neurocognitive, psychological, and physical functioning. The age at injury plays an essential role and impact the child's/youth's ability to learn new skills. ABI survivors face numerous cognitive and physical challenges that can hinder their reintegration into society. Peer support can facilitate this reintegration by supporting them to overcome challenges with cognitive, physical, and emotional issues that affect their ability to return to everyday activities. This includes education and social roles often further complicating the challenges in adolescence. There is a lack of structured peer-mentor educational programs for youth with ABI. Peer mentors are individuals who have lived experiences of life after an ABI. Peer mentors offer an unique supplement to traditional healthcare services by providing guidance, sharing personal stories, and serving as role models. The Sunnaas Foundation's Mentor Yng program is a peer-mentor education initiative for youth with ABI. The seven-month educational program focus is on leadership, communication, and mentoring techniques that equips participants with self-leadership tools and essential mentoring skills preparing them to provide both emotional and practical support to their mentees. Mentor Yng training promotes professional integration, helping participants reconnect with education, social roles and employment. The program is module based built up around sessions with different topics delt with in focus groups and practical training related to personal goals. Self-development tasks between sessions are mandatory. Learning is facilitated by trained peer mentors across gender, experience, background and sectors from all over Norway.

The program includes practical training at the Sunnaas Foundation's Active Rehabilitation camps, where mentors apply their new skills in real-life settings. This combination

of theoretical learning and hands-on experience fosters both personal and professional growth.
Research supports the effectiveness of peer mentoring in rehabilitation, showing improvements in physical activity, social integration, and overall quality of life.
We will present experiences from training and supporting young mentors with ABI in the Sunnaas Foundation's Mentor Yng program and discuss our experiences up against newly published qualitative research based on our work. Our presentation will include discussion on how such knowledge and certification may strengthen ABI survivors role and performance in the community.

257 Brain Drain of Neurosurgeon in Taiwan

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ABSTRACT

According to data from CEOWORLD which surveyed 110 countries, Taiwan tops the list of best healthcare systems in terms of medical Infrastructure, professionals, medicine availability,cost, and government readiness. This stellar performance comes with intangible cost, which is the brain drain of medial professionals who work in constant high stress environment, particularly neurosurgeons.
Taiwan National Healthcare Insurance (NHI) system, established in March 1995 by the Government, has provided high-quality health care with low insurance premiums. The average monthly insurance premium the typical Taiwanese citizen pays is NT$1377, which is approximately US$42.
Too much emphasis on low premiums is ambivalent. One one hand, it ensures equitable access for 23 million citizens and around 851 thousand non-citizens who hold valid NHI policy. On the other hand, it results in financial problems for the NHI system, which incentivizes medical facilities to find ways to cut costs. This skewed emphasis on cost-cutting has led to an unappealing work environment, characterized by long working hours and low salaries. The strain on the health-care system is evident in the nurse-to-patient ratio, which averages 1:4 in the States, but is 1:8.6 in Taiwan. Taiwan doctors work longer than their counterparts in other countries, with an average of 59.8 hours per week compared with 49.6 hours per week for similar level physicians in the States. Neurosurgeons are on top of the working hour list. Such a unforgiving work environment considerably affects patient safety and increases burnout for nurses and young doctors.
The number of neurosurgeon is highly regulated based on the number of general population and training center. In the past few years, though the number of board certified neurosurgeon had been stable(21-29 per year), the number of resident who chose neurosurgery has trending down. Some training centers had zero applicant. However, the number of young doctors who practices in esthetic clinic surges. As of 2023, the number of doctors practicing in neurosurgery and esthetics is 689 and 12,000, respectively. One of the explanations for the brain drain is the risk-and-compensation mismatch from NHI payment scheme.
As Taiwan population ages, the brain drain will inevitably worsen. An increasingly ageing society in Taiwan would further exacerbate the NHI financial burden, as previous studies have shown higher healthcare use and societal care costs among the elderly.
Taiwan healthcare system needs an overhaul. One is to raise the insurance premium to reflect the reality of an ageing society and an under-resourced healthcare system. Another change is to adopt reasonable payment scheme for neurosurgeons and other specialists who provide services for critical/complicated patients in order to align with the standards observed in other high-income countries.

258 Prevalence of the Minimally Conscious State Among Institutionalized Patients in the Netherlands. A Nationwide Study

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ABSTRACT

Introduction: The minimally conscious state (MCS) is a prolonged disorder of consciousness (PDOC) and one of the most severe outcomes of acquired brain injury. Prevalence data are scarce. In the Netherlands, since 2019, almost all new patients with a PDOC after acquired brain injury are admitted in a so called "chain of care" embedded within a nationwide network of academic expertise. After hospital discharge, early intensive neurorehabilitation (EINP) is offered for up to 14 weeks. EINP patients who do not recover consciousness can continue their rehabilitation in a prolonged intensive neurorehabilitation program for up to 24 months post event, in one of three specialized nursing homes. The aim of this study was to establish the nationwide point prevalence of institutionalized patients in MCS in the Netherlands.
Methods: This was a descriptive cross-sectional study in which all 86 Dutch hospitals, all five specialized PDOC rehabilitation facilities, and all 274 nursing homes were asked whether they were treating patients with a PDOC on the point prevalence date of September 15, 2021. Patients were eligible for inclusion when they had a PDOC after acute acquired brain injury with a duration ≥ 4 weeks and were 16 years or older. Each patient's legal representative provided informed consent for their inclusion. Patient level of consciousness was verified using the Coma Recovery Scale-Revised (CRS-R) in a single assessment session performed in the facility of residence by an experienced physician. Data on patient demographics, etiology, level of consciousness, facility of residence, and clinical status were collected from a questionnaire by the treating physician.

Results: Seventy patients were reported to have a PDOC, of whom six were excluded. The level of consciousness was verified for 49 patients, while for 15 it could not be verified. Of the patients verified, 38 had a PDOC, of whom 32 were in MCS (mean age 44.8 years, 68.8% male). The prevalence of institutionalized patients in MCS is 0.2–0.3/100,000 Dutch inhabitants. Traumatic brain injury was present in 21/32 (65.6%) of these patients. Specialized PDOC rehabilitation was received by 17/32 (53.1%) of patients, with the rest admitted to nursing homes. The most frequent signs of consciousness on the CRS-R were visual pursuit 15/32 (46.9%), reproducible movement to command 13/32 (40.6%), and an automatic motor response 10/32 (31.3%).
Conclusions: This study shows that a nationwide prevalence study of patients in MCS can be successfully conducted within a specialized chain of expertise in which PDOC rehabilitation and chronic care are connected. The prevalence of institutionalized patients in MCS in the Netherlands is low. These findings are used for further organization of PDOC care in the Netherlands.

259 Medical Complications and Advance Medical Decision-Making in the Minimally Conscious State

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ABSTRACT

Introduction: Medical complications occur frequently in the minimally conscious state (MCS) and influence advance medical decision-making. Within a nationwide network of centralized care for patients with a prolonged disorder of consciousness (PDOC), a nationwide prevalence study on MCS was conducted, which also provided the opportunity to study to collect clinical data. This study aimed to report on medical complications and advance medical decision-making in a nationwide group of MCS patients.
Methods: In this descriptive nationwide cross-sectional study, patients with a possible PDOC were reported by medical directors of hospitals, specialized PDOC rehabilitation, and nursing homes. We aimed for 100% verification of the level of consciousness (LoC) with the Coma Recovery Scale-revised. Characteristics on medical complications and advance medical decision-making characteristics were collected in a questionnaire, completed by the treating physician. In this questionnaire, the following characteristics were asked: etiology of brain injury, level of consciousness, presence indwelling devices such as gastric tubes and tracheostomy, and medical complications from the onset of brain injury. Also, treating physicians were asked to report the current agreed-upon treatment scenario, the scenario they thought was most appropriate, and could report any details about the conversations held about advance medical decision-making.
Results: Seventy patients with a possible PDOC were reported, 49 of whom the level of consciousness was verified with the Coma Recovery Scale-revised. The MCS population consisted of 32 patients: 65.6% traumatic etiology, 68.8% male, one patient was admitted to the hospital (3.3%), 17 to specialized PDOC rehabilitation facilities (53.1%), and 14 to nursing homes (43.8%). Almost all patients had (naso)gastric tubes (n=31), 11 a cerebrospinal fluid shunt, and 6 a tracheostomy. The median number of medical complications per patient was 2-10 (median 5). Hypertonia/spasticity (81.3%) and pneumonia (50.0%) occurred most frequently. Characteristics about advance medical decision-making showed that most patients had curative goals: 3 patients had a fully curative treatment scenarios, 29 a scenario with ≥ 1 treatment restrictions. Of the patients with treatment restriction, the scenarios were described as palliative in two patients, and as symptomatic in two other patients. Conversations about medical treatment were complicated by disputes with next of kin, inability to evaluate medical treatment because of medical instability, next of kin not being ready to discuss medical treatment, or a treatment scenario explicitly based on requests of next of kin.
Conclusions: Medical complications are common in MCS patients and legitimate deployment of specialized care across acute, post-acute and long-term care. Treatment scenarios mostly have a curative character and discussions about medical treatment can be complicated. Further longitudinal research is recommended to improve the understanding of the process of advance medical decision making.

260 Feasibility of a Self-Management Intervention (SEMPO) in the Sub-Acute Phase of Moderate to Severe Traumatic Injuries

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ABSTRACT

Background: Traumatic injuries, defined as physical injuries with sudden onset, are a leading cause of physical, cognitive,

emotional, and behavioral impairments, causing long-term disability. A recent study found that approximately 50% of patients with multiple trauma, traumatic brain injury, and spinal cord injury, had unmet needs for rehabilitation and health services in the first year post-injury. To address these needs, a self-management program, SEMPO, especially tailored to the sub-acute phase (3-4 months postinjury) after trauma has been developed. In preparation for a full-scale randomized controlled trial (RCT), a feasibility study was conducted.

Objective: This non-randomized feasibility study focused on the intervention arm of a planned RCT. The primary study aims were to evaluate recruitment procedures, drop-out-, and attendance rates. Secondary aims included assessing the program's acceptability, perceived usefulness, and fidelity of delivery.

Methods: SEMPO is a manualized group-based program consisting of eight sessions, each lasting 2-2.5 hours, delivered by a multidisciplinary rehabilitation team. The sessions cover psychoeducation, action planning, training in problem solving, and facilitating peer-sharing experience. The program aims to improve self-efficacy in managing injury-related consequences. To be included in the trial, patients needed to be 18-72 years of age, reside in the southeast region of Norway, and admitted to the Trauma Centre at Oslo University Hospital within 72-hours after moderate to severe trauma, assessed by New Injury Severity Scores > 9. Patients could choose to receive the program either face-to-face or delivered by telehealth. A follow-up at the end of the intervention and after three months was included. Feasibility was evaluated according to pre-defined success criteria (see details in Clinical Trials register: NCT06093074).

Results: Of 24 eligible patients, 11 consented to participate; nine males and two females, with a median age of 46. The consent rate of 46% was lower than expected. The drop-out rate was 9% and attendance rate at sessions was 89%, both deemed highly feasible. Manual adherence in intervention delivery was 97%, also considered highly feasible. Participants rated the program as feasible, and all participants would recommend the program to others, citing peer support and increased understanding of injury consequences as key benefits. The telehealth version delivered to two participants revealed technical difficulties, including equipment restarts and disrupted video streaming, resulting in lower feasibility for the telehealth delivery.

Conclusions: This study demonstrated that SEMPO is feasible for patients in the sub-acute phase after moderate to severe injury, with high retention, attendance, acceptability, and satisfaction rates. However, the low consent rate of 46% indicated a need to improve recruitment procedures before the full-scale RCT. Additionally, the telehealth delivery faced technical challenges, indicating a need for improved technical solutions in the RCT.

261 Exploring the Influences of Traumatic Brain Injury (TBI) on the Experiences of Individuals Who Are Homeless or Marginally Housed: A Scoping Review

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ABSTRACT

Background: Traumatic brain injury (TBI) is an underrecognized public health problem influencing the health trajectories of the homeless population. People with TBI who live in precarious housing situations or experience homelessness often rely heavily on healthcare and community support. Current health and social service approaches have failed to adequately address the unique support requirements of homeless individuals with concurrent TBI to acquire and maintain stable housing. This scoping review aims to better understand the challenges and needs of this population and to recommend ways forward to mitigate these issues.

Methods: A systematic search of electronic databases (MEDLINE, CINAHL, Embase, PsychINFO, and Web of Science) was conducted to identify peer-reviewed articles that met predetermined eligibility criteria. A two-step process was undertaken by two independent reviewers, assessing title/abstract and full articles, respectively, based on inclusion/exclusion criteria, leading to the final 18 articles included in the review.

Results: Of the 18 articles included in the review, 15 studies used quantitative approaches, two used mixed methods, and one employed qualitative methodology. TBI influences various aspects of life in the homeless population, including health status, social lives, and service utilization. Physical issues (e.g., seizures, migraines) and cognitive problems (e.g., attention deficits) are common in this population, and a history of moderate or severe TBI is linked to a significantly higher likelihood of mental health conditions, such as substance abuse and suicide risk. These challenges can lead to poor self-management skills and memory loss, resulting in non-adherence to medication. Furthermore, TBI influences community reintegration, with studies indicating increased odds of incarceration, higher rates of healthcare and social service utilization, and limited access to these services among individuals experiencing both homelessness and TBI. Housing

service providers have also reported uncertainty about their knowledge and expertise regarding TBI, reflecting a significant knowledge gap among these providers. To address these challenges and needs, routine TBI screenings in homeless care facilities and improved access to neuro-specific rehabilitation are recommended. These measures, along with considering homelessness risk factors in TBI treatment, could enhance social functioning and prevent future homelessness.
Conclusion: Structured education and training for professionals in healthcare and social organizations working with individuals experiencing homelessness and TBI is necessary to close knowledge gaps and shift attitudes. Moreover, adopting a more holistic and multi-dimensional approach could better support this population and enhance their likelihood of successfully exiting homelessness and improving their overall well-being. This necessitates the delivery of integrated services that combine housing support with services tailored to individual needs.

262 Sleep Quality and Duration Are Associated With Better Mental Health Outcomes In Paediatric Brain Tumour Survivors

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ABSTRACT
Introduction: The neurocognitive outcomes of pediatric brain tumor survivors (PBTS) have been extensively studied but the prevalence of mental disorders, behavioral & emotional difficulties remained unclear. Furthermore, limited studies have been conducted on factors that are associated with the mental health outcomes of PBTS.
Methods: A retrospective cohort study of PBTS diagnosed between 2005 and 2020 was conducted using the clinical data extracted from the Clinical Management System of the public hospitals in Hong Kong. Parents of PBTS were invited to complete an online survey on family demographics, the psychosocial wellbeing of PBTS, lifestyle habits and parental stress.
Results: The clinical data of 274 PBTS age 0 to <24 years were included. 29/ 274 patients (10.58%) had ADHD, 19/274 patients (6.93%) had ASD, and 12/274 patients (4.38%) were diagnosed with intellectual disability (ID), indicating a higher prevalence of mental disorders in the PBTS cohort compared with the general population. An overlapping diagnostic outcome of mental disorders was also found in the cohort. Epileptic seizure was associated with the risk of intellectual disability($p<0.001$). Logistic regression demonstrated that patients receiving chemotherapy or radiotherapy were susceptible to emotional problems (OR = 3.22, p=0.015 for chemotherapy; OR = 2.84, p=0.021 for RT). Emotional/ behavioural problems were associated with longer follow-up time (OR = 7.87, p=0.005). A total of 74 parents of PBTS completed the online survey. The mean age of PBTS was 13.18 years, SD= 6.16 years with 42.1% female. Better sleep quality was associated with fewer emotional and behavioral problems ($r = -.34$, $p = .004$) and reduced ADHD symptoms ($r = -.42$, $p < .001$), after adjusting for age and socioeconomic status. Additionally, longer sleep duration correlated with fewer emotional and behavioral issues ($r = -.25$, $p = .038$) and reduced autistic features ($r = -.36$, $p < .001$), after accounting for age and socioeconomic status.
Conclusions: Paediatric brain tumour survivors are at risk of mental disorders. Better sleep quality and longer sleep duration were associated with fewer emotional and behavioral difficulties.

263 Prognostic Evaluation of Anoxic Disorders of Consciousness Through fMRI-Based Integrated Information.

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ABSTRACT
Aim: This study investigates the application of Integrated Information Theory (IIT) and Phi values, derived from resting-state fMRI, to predict long-term outcomes in post-anoxic patients with prolonged Disorders of Consciousness (pDoC), including vegetative state (VS) and minimally conscious state (MCS).
Methods: We retrospectively analyzed data from 18 anoxic pDoC patients, extracted from two datasets: Dataset A (n=6; mean age 57 ± 21.5 years; 2 females, all VS) and Dataset B (n=12; mean age 45 ± 13.5 years; 7 females, 9 VS). Dataset A patients were scanned using a 3T Siemens Biograph mMR tomograph at IRCCS SDN, Naples, while Dataset B patients were scanned on a GE MR 3T HDXt scanner at IDC-Hermitage, Naples. Healthy controls (n=24; aged 20-64) were scanned at St. Joseph's Hospital, London, Ontario, using the same Siemens Biograph mMR scanner and protocols as Dataset A. Patients were followed for up to 12 months post-injury. Resting-state fMRI data were preprocessed using standard toolboxes (SPM12, FSL), and time series were extracted from the five most representative regions of interest (ROIs) within 11 Resting-State Networks (RSNs). Transition Probability Matrices (TPMs) were constructed, and Phi values

were calculated using the PyPhi package, with validation through temporal and spatial permutation tests.
Results: Phi values across all RSNs were significantly higher in the control group compared to pDoC patients ($p<0.001$). Patients with positive outcomes (n=4; 2 VS to MCS minus; 2 MCS minus to MCS plus) in Dataset B had higher Phi values than both negative outcome groups (B+ vs B-: $p<0.001$; B+ vs A-: $p=0.04$). Dataset A's negative outcome group exhibited higher Phi values than Dataset B's negative group ($p=0.01$). In network-specific analyses, controls showed significantly higher Phi values in four RSNs (cingulo-parietal, cingulo-opercular, ventral attention, visual). The retrosplenial temporal network demonstrated higher Phi values in controls and B+ compared to both negative outcome groups. Permutation tests validated that Phi values from RSNs were consistently higher than those from randomized regions.
Conclusions: Phi values derived from rs-fMRI hold promise as potential prognostic markers for assessing outcomes in post-anoxic pDoC patients. These results suggest that IIT may provide valuable insights into the neural mechanisms underlying recovery in pDoC, though further validation is required for clinical application.

265 Does Traumatic Brain Injury Create a Chronic Health Condition for Children?

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ABSTRACT
Traumatic Brain Injury (TBI) can occur just once or multiple times during childhood. As a result of TBI in childhood, changes in health, cognition, family environment, and behavior can affect a child's learning, self-regulation, and social participation. Although children typically recover well from the injury, effects can evolve beyond the injury and be persistent over time, even for milder forms of TBI. This raises the possibility that for some children TBI may require long-term medical follow-up, similar to how chronic health conditions are managed.
TBI affects children differently than adults because it can impact brain development during key periods that may alter developmental trajectories over time. Recent research describes longer term effects in children, including changes in cognition, behavior, and mental health. It has also been documented that there are significant healthcare and school service needs years after the initial injury for all TBI severities. Unmet needs have been documented that include the areas of school support, mental health, communication, pain management, and global healthcare service access. The effects of TBI during childhood can also continue into adulthood as reported by studies examining adults with a history of childhood TBI.
A TBI during childhood can impact development, learning, and social participation. It is important to understand the long-term issues, develop management and treatment approaches, and ensure the child receives monitoring and support over time to ensure good health and wellness outcomes in adulthood. This presentation will describe what is known about the potential longer-term effects of childhood TBI to support the notion that TBI could be characterized as a chronic health condition for children.

266 half a Century of Insight: A Systematic Review of Language and Pragmatic Deficits in Right Hemisphere Brain Damage (1970-2024)

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ABSTRACT
Context: Research on language and pragmatic impairments in right hemisphere brain damage (RHD) is relatively sparse compared to left hemisphere brain damage studies. With 50–80% of individuals experiencing language-pragmatic deficits following a right-sided stroke, addressing this knowledge gap is crucial. This systematic review aims to consolidate existing knowledge and guide future research in this critical area. Focusing on studies published between 1970 and 2024, the review provides a comprehensive overview of half a century of research on RHD-related communication disorders.
Methods: A PRISMA-guided review was conducted, initially identifying over 16,275 papers. After a rigorous double-blinded screening process involving title and abstract reviews 1,255 were discarded followed by 783 after full-text screening articles. Methodological quality evaluation then excluded another 122 articles, leaving 318 for data extraction.
Results: Although data analysis is ongoing at the time of submittal, data-driven preliminary findings reveal several key points. Most studies employed group experimental designs with relatively small sample sizes, focusing on characterizing the linguistic aspects of communication. Notably, only eight studies were interventional in nature. These trends highlight the need for larger-scale studies and more diverse research approaches. Imaging was commonly used for lesion diagnosis, providing valuable insights into the neuroanatomical correlates of communication deficits. Within the predominant focus on linguistics, equal attention was given to production

and comprehension. This balanced approach provides a comprehensive view of linguistic deficits in RHD. Notably, paralinguistic and extralinguistic domains were also examined in a considerable number of studies, reflecting a growing recognition of the multifaceted nature of communication disorders in RHD. However, standardized RHD batteries were rarely employed, suggesting a potential gap in comprehensive assessment practices. Nearly half of the studies (47%) did not assess major cognitive domains beyond unilateral neglect. This limited scope of cognitive evaluation may hinder a full understanding of the complex interplay between various cognitive functions and communication abilities in RHD patients.
Conclusions: This ongoing review highlights the evolving nature of research on impairments of language and pragmatics following RHD. The findings reveal both progress and gaps in our understanding of these disorders. The predominance of small-scale studies and the limited use of standardized assessment tools suggest areas for methodological improvement in future research. The review's findings will have significant implications for both research and clinical practice. These insights will contribute to the development of improved assessment and treatment tools for individuals with RHD, potentially leading to more targeted and effective interventions. This comprehensive analysis will not only consolidate our current knowledge but also pave the way for advancements in understanding and treating language and pragmatic deficits in individuals with RHD.

267 Transition to Adulthood for Children Who Experienced Acquired Brain Injury: Lessons Learned from a Model Program for Adolescents.

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ABSTRACT

Objective: The purpose of this presentation is to describe lessons learned from a model program that was developed to serve adolescents who experienced ABI in childhood during their transition to adulthood by providing insights to achieve good health and assessment of needs in both healthcare and educational/career areas.
Methods: Participatory Action Research methods were utilized for program development by collaborating with focus groups of teen participants and stakeholders. Activities were devised based on best practices for cognitive rehabilitation, direct instruction, and practice of cognitive and metacognitive strategies, technology use, peer coaches and incorporation of multiple stakeholders, including family members.
Results: We learned the importance of technology utilization, completing surveys of vocational interests, peer coaches, and post program follow-up to better understand both healthcare and career needs of adolescents who experienced TBI and are transitioning to adulthood.
Conclusions: Adolescents who experience a childhood ABI benefit from education about the injury effects, technology use for self-management, peer coaches and connection to both healthcare and career opportunities following high school graduation.

268 Recovery from Concussion/Mild Traumatic Brain Injury in The Non-Athletic Population: A Systematic Review

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ABSTRACT

Introduction: According to the most recent Consensus Statement on Concussion in Sport (Amsterdam 2022), up to 30% of children and adults with sport-related concussion experience persisting post-concussive symptoms which is defined as symptoms lasting more than one month. However, studies included in the systematic reviews of the Amsterdam 2022 consensus didn't include concussion/mild Traumatic Brain Injury (mTBI) in non-athletic population. The aim of this systematic review was to document the mTBI symptom resolution rate at different time points in a non-athletic adult population and to identify the prognostic factors influencing recovery in this population.
Methods: A literature search was conducted in the Embase, Ovid Medline and CINAHL databases. Inclusion criteria were: non-athletic population between 18 and 65 years of age with acute mTBI, prospective cohort studies with a minimum follow-up of one month, and post-concussion symptoms as a measure of recovery. The number of recovered patients at each follow-up was extracted from the studies as well as the reported prognostic factors. The risk of bias of each included study was assessed using the QUIPS assessment tool for prognostic factor studies.
Results: Of the 16 included studies, the risk of bias was high for two studies, moderate for ten studies, and low for four studies. At one, three, six, and 12 months, the proportion of full symptom recovered patients were 55.6% (253/455), 54.9% (365/665), 52.3% (405/774), and 61.8% (102/165), respectively.

The intensity and number of initial symptoms and psychiatric history were the most reported prognostic factors. High age, female gender and education levels appear to have limited predictive potential.
Conclusion: Up to 45% of adults still experience symptoms at one month following a concussion/mTBI in a non-athlete population which is significantly higher than the sport-related concussion population. The intensity and number of initial symptoms and psychiatric history remain the most reported prognostic factors.

269 Towards a Consensus on Defining and Naming Covert Awareness: A Delphi Study

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ABSTRACT

Background: Even with the most careful behavioral assessment, willful brain activity might still be missed in patients with Disorders of Consciousness (DoC). Indeed, for the past two decades, clinicians have been facing a group of patients who are unable to show any behavioral sign of consciousness at the bedside but are able to respond to active neuroimaging or electrophysiological paradigms. Even though researchers and clinicians recognize its existence, there is still no wide consensus regarding the nomenclature for this clinical entity with various names used across the literature such as: covert awareness (CA), cognitive motor dissociation (CMD), functional locked-in (fLIS), and non-behavioral MCS (MCS*).
Objective: Using a Delphi method, this study aimed at looking at the level of agreement existing among international experts for these names and their related definition across the literature.
Methods: a Delphi method was used to investigate the level of consensus on names and related definition for CA, CMD, fLIS, and MCS*. Three hundred experts were contacted. REDCap was used as a platform to build and send electronically the survey to participants. The survey had 11 to 16 statements related to definitions and three to 4 questions related to name preferences. The survey duration was kept around 30 minutes. Consensus for agreement was defined as a median score of 5, an IQR ≤ 1, and ≥ 75% scoring 4 or 5.
Results: Of the 300 invited experts, 96 (32%) agreed to participate and fit our criteria for expertise. Seventy-five experts (78%) completed all rounds. Most experts were clinical scientists (71%) and worked in rehabilitation setting (63%). They were located in Europe/UK (49%), in USA (32%) and in other parts of the world (19%). This Delphi study included only 2 rounds since consensus was reached for more than two thirds of the statements on Round 2. A full consensus was reached on a definition for CA. Moreover, a consensus only for CA was reached when experts were asked which name they would agree upon (87%).
Conclusion: the general goal of our study was to inform future discussions on taxonomy for such state. In this first Delphi study, our large group of international experts mostly agreed upon "Covert Awareness" (CA) as the term of choice to call this peculiar entity. However, this study has limitations and further investigations involving international experts with various background but also non-experts should be performed.

270 Leveraging Log Jacobian Maps to Capture Intra- and Inter-Individual Variability in Pediatric Brain Morphological Changes

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ABSTRACT

Introduction: Understanding how the brain changes during development is essential to identifying both typical and atypical neurodevelopment. One key challenge in this field is distinguishing between intra-individual variability (changes occurring within the same person over time) and inter-individual variability (differences between individuals). This distinction is particularly important when studying pediatric brain development, where the magnitude of inter-individual differences can overshadow the more subtle intra-individual changes. Our study investigates whether log Jacobian maps derived from brain deformation fields can encode both intra- and inter-individual variability using longitudinal pediatric MRI data.
Methods: We analyzed T1-weighted MRI scans (N = 279 images) of 96 children (46 females) aged 2 to 7 years from the Calgary Preschool Dataset, generating 434 intra-individual pairs (comparing scans of the same child at two different ages) and 433 inter-individual pairs (matching children by initial age, age interval, and sex). These images were registered using the Elastic SyN ANTs algorithm to compute log Jacobian maps, which represent local volume changes in the brain, ranging from -1 (contraction) to 1 (expansion). The log Jacobian maps were used to train a 3D convolutional neural network to classify intra- versus inter-individual changes. Two experimental scenarios were explored: one allowing overlap between the training and test sets for the same subjects, and another with no overlap.
Results: We used 10-fold cross-validation to evaluate both scenarios, finding that the no-overlap scenario yielded slightly higher accuracy and F1 scores. The highest accuracy (0.989)

was achieved when inter-individual pairs were matched not only by age but also by sex. The log Jacobian values showed that intra-individual pairs had a broader distribution of local volume changes compared to inter-individual pairs, indicating more pronounced brain morphology shifts within individuals. This finding aligns with the expectation that inter-individual comparisons, involving different subjects, would capture more global deformations rather than localized changes.
Discussion: Our results demonstrate that log Jacobian maps can effectively differentiate between intra- and inter-individual variability in pediatric brain development. This approach has the potential to contribute to modeling typical neurodevelopmental trajectories and detecting deviations that could signal pathology.
Conclusion: Looking forward, we plan to extend this methodology to study mild traumatic brain injury (mTBI) cases from the KOALA study. TBI has been linked to changes in brain morphometry (King et al., 2019), yet there are few studies on children younger than 6 years, where TBI prevalence is higher. This future work will apply our log Jacobian map-based pipeline to pediatric mTBI cases to investigate whether this technique can detect subtle brain changes following injury. Given the growing concern over the long-term effects of mTBI on children's brain development, particularly in volumetric changes and functioning, this proposed method could provide valuable insights into how mTBI affects neurodevelopmental trajectories.

271 Evaluating the Impact of Interact-ABI-lity: A Self-Guided Online Course for Communication Partners of People with Acquired Brain Injury

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ABSTRACT

Background: People with acquired brain injury (ABI) often experience challenges in conversations. Upskilling communication partners in using supportive communication strategies can promote successful interactions and is recommended best practice. However, communication partner training research evidence is limited by small sample sizes and inadequate follow-up assessment to confirm outcome maintenance. Communication partners report challenges accessing communication partner training, but there is potential for online tools to increase access. This study focused on outcomes in a large sample of participants completing a self-guided online program called interact-ABI-lity, designed to improve confidence and knowledge of communication partners of people with ABI.
Methods: This study used a prospective case series design to evaluate the impact of interact-ABI-lity. A mixed methods approach was used including a demographics questionnaire, a confidence and knowledge questionnaire (administered pre, post and at 3-month follow-up), and open-ended questions regarding use of course content and recommendations for course improvement. Quantitative data were analysed with Related-Samples Wilcoxon Signed Rank Tests. A descriptive content analysis of qualitative data was conducted.
Results: Between February 2023-April 2024, 851 individuals agreed to participate, and 369 participants (43%) completed interact-ABI-lity in full and completed the post-training questionnaire. A total of 38 participants completed the 3-month follow-up questionnaire. There was a significant increase from pre-intervention to post-intervention in self-reported confidence in interacting with people with ABI (pre: median rating = 3/5, post: median rating = 4/5, $p < .001$). Confidence was maintained at 3-month follow-up ($p = .81$). Evaluation of outcomes relating to knowledge of communication strategies is currently in progress. Qualitative analysis found that participants described the impact of training on their interactions, and perceived the content to be relevant. They reported sharing their learning from the course with others. Participants also identified valued components of the training and recommendations for improvement.
Discussion: The quantitative and qualitative data in this study provide preliminary evidence for the usefulness of interact-ABI-lity in training communication partners to successfully interact with people with ABI. The strengths of this study include a large participant sample with evidence of maintenance of outcomes over time. However, there was a low retention rate of participants at 3-months follow-up, and the validity of the outcome measures used in this study has not been established. Further research is needed to identify valid outcome measures suitable for use for evaluating knowledge and confidence of communication partners, and to strengthen the evidence for interact-ABI-lity using a randomized controlled trial.

272 Massive Open Online Course (MOOC) for Knowledge Translation on Concussion Prevention After the 6th International Conference on Concussion in Sport

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ABSTRACT

Background: Knowledge translation, including updated recommendations after an international consensus, can be challenging. One way to share knowledge could be using a Massive Open Online Course (MOOC), making it available to more people, promoting global engagement.
Objectives: The objective of this preliminary study was to evaluate the feasibility and effectiveness of a MOOC as a global knowledge translation (KT) strategy in improving knowledge after the 6th International Conference on Concussion in Sport.
Design: A pre-experimental design was used to evaluate de-identified learning analytics including participation, and knowledge gains. Participants were self-registered in the MOOC on concussion spring 2024.

Intervention: The MOOC included six modules over an 8-week period: 1) Introduction to Concussion, 2) Prevention, 3) Detection, 4) Initial management, 5) Access to Care (individuals with persisting symptoms), and 6) Adaptation, Implementation and Revision of Protocols. Each module included interactive learning materials and evaluations.
Main Outcome Measurements: The main outcomes were the number of registrants; pre- and post-course exam scores. Optional survey questions documented participant type [e.g. parent, teacher or school administrator, health care professionals (HCPs), athlete, coach or sport organization stakeholder, other (non-HCP) and intent to develop/update a protocol.
Results: A total of 2,162 participants registered and 1022 (47.3%) accessed the course in the initial six weeks. The majority [(n=612/829), 73.8%] indicated being HCPs and 315/807 (39.0%) indicated the intent to develop/update a protocol. The pre-course test was completed by 859 participants (84.0%), with a mean score of 54.7% (95% CI: 34.6 - 74.8). The mean post-test score was 79.0% (95% CI: 68.0 – 90.1), with a significant difference between test results (t=-4.50, p=0.001). For new content questions from the Amsterdam consensus, the average pre-test score was 43.9% (95%CI: 21.4 – 66.3) post-test was 75.9% (95%CI: 61.2 – 90.6) (t=-6.3, p< 0.001).
Conclusions: The results suggest that the MOOC could be an effective approach to knowledge translation and effectively translate new recommendations for concussion following the Amsterdam International Consensus Statement publication.

273 The Co-CALIBRATE Framework: An Evidence-Based Framework for the Cultural Adaptation of Brain Injury Intervention Tools with Stakeholder Engagement

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ABSTRACT

Background: The translation and adaptation of healthcare resources for people with acquired brain injury (ABI) has significantly increased over recent decades, enabling cross-cultural comparisons and providing essential resources for clinical practice in multicultural and multilingual settings. While numerous guidelines exist for translating and adapting assessment tools, the literature offers limited guidance on culturally adapting interventions. Existing guidelines for adaptation of interventions are often criticized for lacking flexibility, real-world applicability, and sufficient detail in describing core processes. Additionally, current recommendations and guidelines do not adequately address the specific needs and considerations for people with cognitive and communication changes following ABI as part of the cultural adaptation process. This project will develop a comprehensive framework for translating and adapting evidence-based interventions for brain injury rehabilitation into other languages, with a focus on co-design to ensure cultural sensitivity. This new framework will enhance access to treatment for linguistically and culturally diverse populations.
Methods: The Co-CALIBRATE (Co-Designed, Cultural And Linguistic Adaptation of BRAin Injury TrEatments) framework for adapting interventions for individuals with ABI was developed through a collaborative and iterative process, involving an international team of researchers experienced in the translation and cultural adaption of brain injury rehabilitation tools and in co-designing interventions for individuals with ABI, including those with associated cognition and communication disorders. The study was conducted in two stages. Stage one focused on developing the Co-CALIBRATE Framework and involved several key phases: 1) A comprehensive literature review examining 1a) existing models and processes for translation and adaption, and 1b) co-design principles; 2) The identification and synthesis of key concepts and core processes from existing evidence-based recommendations and guidelines; and 3) Iterative development of the framework through project team discussions. In the second stage, the proposed model was then iteratively reviewed by an international expert committee (including people with lived experience of ABI) and their feedback was incorporated to inform the final version of the framework.
Results: The final version of the framework details the various phases involved in the culturally sensitive translation and adaptation of brain injury rehabilitation tools. It emphasizes the importance of stakeholder engagement and accounts for cognitive and communication impairments to ensure both cultural relevance for and acceptability while maintaining fidelity in the target population. The application of the framework processes are demonstrated in a case example of the authors' current adaptation of ABI intervention resources.
Discussion: The Co-CALIBRATE Framework is an internationally endorsed framework that provides a foundation for future adaptation processes in ABI interventions. Its application in future cultural adaptation projects will further evaluate suitability across different diverse cultural contexts and intervention types, with possibility for further refinement to meet stakeholder needs.

274 Optimising Co-Design Methodologies for People with Communication Disorders Following Neurological Impairment: Establishing Criteria, Adapting Practices, and Enhancing Inclusivity

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ABSTRACT

Background: Co-design methodologies, which actively involve stakeholders in the design and development process, have gained traction in various fields, including healthcare. In the context of brain injury rehabilitation, these collaborative approaches are becoming more pertinent, as they offer the potential to create more tailored and effective interventions for individuals with communication disabilities. However, the variety of different approaches, techniques, and methods available can be overwhelming for researchers and may not always account for the specific communication challenges faced by this population.

Method: This meta-synthesis study investigates the application of co-design methodologies in the development of rehabilitation tools and resources for individuals with communication disabilities as a result of acquired brain injury (ABI). The ultimate aim of the study is to establish minimum co-design requirements for considering an intervention as "co-designed" and to develop adaptations to activities as informed by the evidence base, to support authentic inclusion and maximize participation. By systematically reviewing and extracting data from existing literature on co-design practices, the research explores various settings, formats, activities, tools, feedback mechanisms, and inclusivity strategies employed in these studies. Special attention has been given to the challenges and adaptations necessary for involving individuals with communication disorders in co-design processes. Systematic searches of nine databases (PsycINFO, MEDLINE, CINAHL, Embase, Cochrane Library, Scopus, Web of Science Core Collection, speechBITE, and PsycBITE) were conducted. The study includes reports on stakeholder engagement involving young people (12+) and adults with neurological impairments affecting cognition and communication.

Results: The analysis of the results of the literature searches is currently underway. This conceptual framework of co-design as applied to people with communication disabilities following ABI, will outline a range of different approaches for implementing co-design with people with communication disorders, discuss the potential barriers and adaptive strategies to enhance accessibility, and promote informed decision-making during the research design process. This research will also result in the creation of a reporting checklist tool for clinicians and researchers, aimed at improving the consistency, transparency, and scientific rigor of future co-design studies that include people with communication disorders.

275 Cognitive Function In Women Affected By Intimate Partner Violence-Caused Brain Injuries

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ABSTRACT

Introduction: Intimate partner violence (IPV) often results in brain injuries (BI) from direct trauma such as blows to the head or non-fatal strangulation. Although the cognitive impairments arising from IPV-BI are crucial to understanding the full impact on survivors' quality of life, there has been limited quantitative analysis on how these impairments correlate with the severity of IPV-BI. Cognitive deficits can impair daily activities, decision-making, and overall well-being but are frequently overlooked in clinical assessments. This study aims to assess cognitive functions among IPV-BI survivors compared to healthy controls to explore the relationship between the severity of IPV-BI and cognitive function.

Methods: Participants were women aged 18-50 who had experienced IPV, recruited through various community support organizations (n = 41). Cognitive domains – including memory, reasoning, concentration, attention, and executive function – were assessed using the Creyos Platform. Performance of the participants was compared to that from the Creyos normative database with approximately 12,000 female participants aged 20-50 years using independent t-tests. Assessments of IPV-BI severity (Brain Injury Severity Assessment - BISA), post-traumatic stress disorder (PTSD) (PCL-5), Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder Scale (GAD-7), and adverse childhood events (ACE) were also collected.

Results: Results from an independent t-test revealed that IPV-BI victims exhibit significantly greater cognitive impairments compared to the non-IPV-BI population. Particularly, differences were observed in visuospatial working memory ($p = 0.039$), working memory ($p = 0.001$), verbal short-term memory ($p = 0.001$), and visuospatial processing ($p = 0.022$).

Conclusions: Preliminary results indicated significant cognitive impairments in IPV survivors with BI compared to healthy controls. These deficits were largest in assessments of memory and attention and much smaller for reasoning and executive function. The findings highlight the need for targeted interventions and support systems to address the cognitive and psychological needs of IPV-BI survivors. These results have potential implications for public health policies and clinical

practices, emphasizing the importance of recognizing and treating cognitive impairments in IPV-BI survivors.

276 Self-Management After Traumatic Injury: Program Design and Study Protocol for a Randomized Controlled Trial of a Self-Management Support Program Delivered in the Sub-Acute Phase After Moderate-Severe Traumatic Injury

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ABSTRACT

Background: Moderate to severe traumatic injuries, including traumatic brain injury, may lead to long-term impaired functioning and problems in daily life activities. A significant proportion of individuals who sustain such injuries report unmet healthcare needs in the first year post-injury. Self-management interventions can improve patient outcomes, but self-management support programs delivered during the sub-acute phase remain scarcely evaluated in this patient population.

Objectives: This study had two objectives: (1) to design a comprehensive self-management program (SEMPO) specifically tailored to individuals with traumatic injuries in the sub-acute phase, and (2) to describe the protocol of a pragmatic randomized controlled trial investigating the effect of the SEMPO program on patient outcomes. We anticipate that SEMPO will enhance self-efficacy in symptom management and prevent long-term impairments and disability.

Methods: The SEMPO program was developed, drawing from established self-management principles and evidence-based rehabilitation strategies, by experienced clinicians and researchers in collaboration with individuals with lived experience with traumatic injury and a national user organization. Effect of the program will be assessed in a randomized controlled trial with both an intervention and a control arm. An exploratory self-selection arm will be included to explore the influence of patients' preferences on treatment effect. The study will include 220 patients, aged 18-72 years admitted to the trauma referral center at Oslo University Hospital directly or within 72 hours with a moderate-severe traumatic injury (New Injury Severity Score > 9) and a minimum 2-day hospital stay. Patient-reported outcomes will be evaluated six months post-intervention, with paralleled time point for the control group. The primary outcome is levels of self-efficacy (the Trauma Coping Self-efficacy Scale), and secondary outcomes include somatic, emotional and cognitive symptom burden, physical functioning and disability, return to work, healthcare utilization, health-related quality of life, and health- and communication competency. Participants will nominate one domain-related measurement as their preferred outcome measure. Clinical Trias identifier: NCT06305819.

Results: The SEMPO program was finalized in April 2024 and consists of eight weekly 2.5-hour sessions delivered in groups of 4-7 participants, either face to face or as a tele-health version. The program incorporates several components, including psychoeducation, goal setting, action planning, practice in compensatory strategies, and problem-solving techniques. The group format facilitates the sharing of knowledge and experiences in management of injury-related consequences among participants, fostering social encouragement.

Conclusions: The development of a self-management support program aligns with a person-centered rehabilitation approach. It integrates the self-management concept into a manualized group-based intervention, specifically targeted at individuals with moderate to severe physical trauma, including traumatic brain injury. Moreover, the inclusion of a self-selection arm provides a unique opportunity to investigate the influence of patient preferences on the outcome effect and adherence to the SEMPO program.

277 Pilot Testing a Novel Mobile Ecological Momentary Assessment Platform ReCoUPS to Monitor Post-Concussion Symptoms and Psychological Health-Related Quality of Life throughout Concussion Recovery

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ABSTRACT

Introduction: Recovering Concussion Update on Progression of Symptoms (ReCoUPS) is a novel mobile ecological momentary assessment platform protocol which monitors concussion symptoms remotely and in real time. The purpose of this study was to determine the feasibility of monitoring post-concussion symptoms and Psychological Health-Related Quality of Life (PHRQoL), and the fluctuations in these outcomes, using ReCoUPS throughout concussion recovery.

Methods: We enrolled 17 college-aged athletes with a concussion (female=11, μ age=20.73±1.15 years) in our pilot study. Demographics, injury information, and enrollment in the ReCoUPS platform with a smartphone were completed within 3 days after injury. Thirty survey questions (i.e., Sport Concussion Assessment Tool6 (SCAT-6) symptom checklist, Patient Reported Outcomes Measurement Information System Emotional Distress Shorts Forms Anxiety and Depression [PROMISAnx and PROMISDepress]), were administered daily throughout

concussion recovery via ReCoUPS text messages. Surveys were terminated within 2 days after full medical clearance and recalled PHRQoL inventories (i.e., "within the past 7 days") were completed. Response rates (frequencies, %) for completed daily surveys were calculated. Cronbach's alpha (α) determined internal consistency of daily momentary PHRQoL (mPHRQoL). Independent linear mixed-effects models estimated the within-person and between-person variance in symptom clusters and PHRQoL with intraclass correlation coefficients (ICCs) to determine the percentage of variability due to between-person differences.

Results: Over half (58.8%) of the participants completed more than 70% of daily surveys, while 82.4% completed over 60% of daily surveys (median days enrolled=12; IQR(1,3)=8,15). There was strong internal consistency among all mPHRQoL items (PROMISAnx α=0.88; PROMISDepress α=0.92). The average total symptom score throughout concussion recovery was 15.26 with standard deviations ranging from 0 to 32.04, indicating variability among participants. The mixed-effects models indicated that the between-person (BP) and within-person (WP) variances were significant contributors to the variation in affective symptoms (BP=4.93(SE=1.99); WP=8.08 (SE=0.96); ICC=0.38; p<0.001), cognitive-ocular symptoms (BP=2.81(SE=1.15); WP=5.42(SE=0.0.64); ICC=0.34; p<0.001), migraine symptoms (BP=9.27(SE=4.44); WP=24.10 (SE=2.89); ICC=0.28; p<0.001), total symptoms (BP=118.52 (SE=51.62); WP=225.21(SE=26.88); ICC=0.35; p<0.001), PROMISAnx scores (BP=2.80(SE=1.08); WP=3.84(SE=0.46); ICC=0.42; p<0.001) and PROMISDepress scores (BP=1.62 (SE=0.61); WP=2.12(SE=0.25); ICC=0.53; p<0.001) daily throughout concussion recovery.

Conclusions: Results from this pilot study indicate that ReCoUPS may be a feasible method of monitoring post-concussion symptoms and PHRQoL throughout concussion recovery, while the PROMISAnx and PROMISDepress may be reliable instruments for measuring these outcomes. Further, there may be meaningful differences in post-concussion symptom scores and PHRQoL between individuals, indicating that some athletes may consistently report higher or lower symptoms than others. Additionally, fluctuations in symptom scores and PHRQoL over time within the same individual were observed, indicating that athletes' symptoms were changing daily throughout concussion recovery. With a larger sample size, we can continue to explore the acceptability, feasibility, and usability of ReCoUPS for future clinical implementation of remote post-concussion symptom monitoring and improved concussion management protocols.

278 Prevalence of Zolpidem Use and its Paradoxical Effects: A Survey-based Study in the General Population

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ABSTRACT

Introduction: Zolpidem is a non-benzodiazepine hypnotic agent commonly used for the treatment of insomnia. Initially administered to manage restlessness in severely brain-injured patients with disorders of consciousness (DoC), it elicited paradoxical consciousness-enhancing effects in ~5-20% of these patients. Interestingly, similar paradoxical effects (e.g., inability to fall/stay asleep, higher levels of restlessness, agitation, concentration) have been observed in the general population, yet the prevalence rate remains unknown. This survey aims to investigate (1) the proportion and purpose of zolpidem use and the prevalence rate of zolpidem-induced paradoxical effects in the general population, (2) common paradoxical effects experienced by zolpidem users, (3) the onset time and duration of the paradoxical effects, and (4) factors predicting paradoxical responses to zolpidem.

Methods: In this cross-sectional epidemiological study, an anonymous survey was developed in English and French and distributed on Alchemer and Prolific Academic online platforms. The survey included dichotomous, multiple choice, and open questions on (1) sociodemographics (age, gender, country of residence), (2) medical history (medical conditions, neurological/psychiatric disorders, medications), and (3)

zolpidem use (purpose, paradoxical effects, onset time and duration of the effects, dosage, subjective perception of the experience). Participants were recruited via (1) network (social media, mailing lists, and institutional websites) and (2) crowdsourcing (Prolific Academic) approaches. The inclusion criteria were set to ≥ 18yo and fluency in English or French. Data were cleaned in Excel and analyzed using RStudio.
Results: Overall, among 15,289 participants (mean age 32 ± 13yo; 52% female; from 84 countries), 781 (~5%) reported to have used zolpidem at least once as a sleep-inducer (94%), recreational drug (7%), psychostimulant (3%), and other (4%; e.g., to reduce anxiety). Among these zolpidem users, 128 (~16%) reported one or more of the following zolpidem-induced paradoxical effects: inability to fall asleep (59%), restlessness (42%), inability to stay asleep (35%), excitation (35%), agitation (26%), increased alertness (19%), increased energy (19%), increased concentration (10%), and other (10%) (e.g., euphoria, paranoia). Paradoxical effects emerged most commonly within the first hour (58%). Participants subjectively perceived these paradoxical effects as unpleasant (42%), annoying (41%), exhaustive (37%), pleasant (22%), exciting (12%), and other (6%) (e.g., embarrassed, anxious). Multivariate binary logistic regression analyses showed neurological/psychiatric disorders were significantly associated with the likelihood of paradoxical responses to zolpidem (LR Chisq = 6.39, df = 1, $p < 0.05$).
Conclusions: The ~16% prevalence rate of zolpidem-induced paradoxical effects is comparable to what is observed in severely brain-injured patients with DoC. As the arousal/awareness-enhancing effects of zolpidem seem similar between the general population and patients with DoC, analogous mechanisms might be underlying these effects. Further studies with multimodal approaches (e.g., neurophysiological, genetic) are warranted to investigate the mechanisms underlying zolpidem paradoxical effects both in DoC patients and in the general population.

279 Building Effective Responses to the Needs of Caregivers of Individual Living with Traumatic Brain Injury: A Multi-phase Study

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ABSTRACT

Introduction: Many individuals living with traumatic brain injury (TBI) must cope with permanent sequelae and rely on close family members for support in managing their new disabilities. Taking on the role of caregiver may involve numerous evolving needs, which if unmet, can significantly impact their lives. Although some resources are available, most are not specifically tailored to the challenges faced by those caring for individuals with TBI (TBI caregivers) and interventions are not always based on robust scientific evidence. Moreover, the greatest effective and acceptable ways to address the needs of TBI caregivers remain largely unknown.
Objectives: To document and prioritize the needs of TBI caregivers.
Methods: This project used a participatory approach in close collaboration with a community organization directly offering services to TBI individuals and their caregivers. A systematic review including quantitative, qualitative and mixed-methods studies, was completed to document the specific needs of this population. The research questions were developed through discussions with stakeholders from the partnering organization. Medline, CINAHL, PsycINFO and Web of Science were consulted. The methodology proposed by the Joanna Briggs Institute was followed, and the Family Needs Questionnaire guided the data extraction and analysis. The findings from this review informed the subsequent phase, which employed the Technique de Recherche d'Informations par Animation d'un Groupe Expert (TRIAGE). This method combines individual and group phases, focusing on building a consensus around prioritizing the most urgent needs. In October 2024, two consensus groups, comprising caregivers (n=8) and community workers (n=8), will be held, with data analysis occurring concurrently.
Preliminary Results: A total of 25 articles were included in the systematic review. The review uncovered a range of diverse needs, reinforcing the necessity of the prioritization phase. Key findings highlighted the critical need for information about TBI prognosis, expected recovery, the rehabilitation process, and potential future impacts. Additionally, the need for peer support, financial assistance, and trustworthy respite care were also identified as major concerns.
Conclusions: Based on the prioritized needs, co-development workshops will be organized to create a tailored program that effectively addresses those needs. This project generates new knowledge to promote best practices in supporting TBI caregivers.

281 Facilitators and Obstacles of Implementing The Cognitive Assistant For Cooking COOK During Its Co-Development Processes : Perspectives of Key Partners of the Residence

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ABSTRACT

Introduction: COOK, a cognitive assistive technology, was developed to support autonomy in meal preparation for adults living with traumatic brain injury (TBI). As part of a user-centered design approach, COOK was co-developed and implemented in an iterative way in an alternative residence. During this period, a close collaboration was established with key partners of the residence. This study aimed to examine their perspectives on the implementation processes, focusing on facilitators and obstacles encountered, their roles, concerns, and favored strategies for hurdles arising during implementation.

Material and Methods: A holistic qualitative case study was conducted, the case representing the residence. Over 14 months, 35 group interviews were held during the implementation phase of COOK involving key partners of the residence (2 managers, 3 practitioners and 4 caregivers), 3 researchers and 3 male residents (March 2016 to June 2017). These group interviews were thus analyzed using the thematic content analysis.

Results and Discussion: Results show that key partners established their roles in managing the residence in terms of its finances and its residents living with TBI. A communication structure was quickly established where each partner shared their expertise to address obstacles related to the implementation process. Identified obstacles and concerns primarily related to the unique limitations of the residents' abilities, combining research and clinical objectives, and the sustainability of the culinary assistant after the research's team withdrawal. Main strategies adopted included adjusting the project to the alternative residence's reality, regular monitoring of the implementation for necessary updates, building a trusted alliance with residents and managing costs related to COOK's implementation.

Conclusions: The implementation of COOK to optimize autonomy in meal preparation for adults with TBI is a complex process, its key components must be carefully considered to ensure the effective integration of assistive technology across various settings in the broader effort to foster more inclusive societies.

282 The Relationship Between Post-Concussion Symptoms, Autonomic-Related Symptoms and Autonomic Function in Youth Post-Concussion

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ABSTRACT

Introduction: Autonomic-nervous-system (ANS) dysfunction is frequently reported after a concussion. It has been proposed as a contributing factor to post-concussion-symptoms (PCS) and complaints. There is a wide overlap between symptoms associated with ANS dysfunction and PCS, e.g. dizziness, nausea, fatigue, and exercise intolerance. But, ANS dysfunction can be manifested in both ANS-related symptoms and ANS impaired function. The relationship between PCS and ANS dysfunction is not well understood. The aim of this preliminary study was to examine the relationship between PCS, ANS-related symptoms and ANS function in youth post-concussion.

Methods: Fourteen youth with concussion (mean age 14.2±2.1 years; 10 females; median 23 [13-64] days post-injury) seen at the Montreal Children's Hospital Trauma Centre Concussion Clinic, were included. PCS were assessed using the Post-Concussion-Symptoms-Inventory for Children (PCSI-C). ANS-related symptoms were assessed using the Composite-Autonomic-Symptom-Score-31 (COMPASS-31). ANS function was evaluated using the Polar H10 device under three conditions: 2-minutes at rest in sitting, 2-minutes grip test and 2-minutes paced breathing test. ANS function was assessed using Heart-Rate (HR) and Heart-Rate-Variability (HRV), including the Standard-Deviation-of-the-N-N-interval (SDNN), and the Root-Mean-Square-of-Successive-Differences-between-N-N-intervals (RMSSD).

Results: The median pre-injury PCSI-C score was 13 (range: 0-34), and post-injury PCSI-C score was 48 (5-66); the median PCSI-C-delta score was 29 (3-60). The median COMPASS-31 score was 22.0 (1.3-38.1). The median HR, SDNN and RMSSD values at rest were 73.6 bpm (61.9-106.6), 50.5 ms (28.9-145.9) and 44.6 ms (18.6-188.7), respectively. Moderate significant positive correlations were found between the delta-PCSI-C and COMPASS-31 scores (rs=0.59, p=0.027), and between the SDNN during rest to the COMPASS-31 scores (rs=0.65, p=0.012). Significantly moderate negative correlations were found between the COMPASS-31 scores and the changes from rest in SDNN and RMSSD during the grip test (rs=-0.56, p=0.036 and rs=-0.59, p=0.025). In addition, a significant moderate negative correlation was found between the COMPASS-31 scores and the changes from rest in RMSSD values during the paced breathing test (rs=-0.55, p=0.041). No significant correlations were found between the delta-PCSI-C score and the HR, SDNN or RMSSD values at rest nor during the tests.

Conclusions: This preliminary study suggests that PCS and ANS symptoms severity are moderately related in youth post-concussion. However, ANS function appears to be related only to the ANS symptoms severity and not the PCS severity. These

results emphasize that PCS and ANS-related symptoms might represent different aspects of the post-concussion injury. Furthermore, it highlights the importance of assessing ANS symptoms and function in addition to the PCS to evaluate ANS dysfunction post-concussion. Further research with a larger sample size and longer follow-up periods is required to examine the influence of other known concussion recovery factors, such as age, sex, and premorbid health conditions, on the relationship between PCS and ANS dysfunction.

283 The Importance of the Hospital Social Worker's Psychosocial Support in Brain Injury Rehabilitation. An Interview Study with Individuals with Acquired Brain Injury and their Close Relatives.

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ABSTRACT

Acquired brain injury (ABI) is a life-changing experience for the individuals and their close relatives. Psychosocial support is critical in helping individuals adapt to and cope with the new conditions following a brain injury. However, knowledge about the different components of psychosocial support and their impact on people with acquired brain injury is limited. The aim of this interview study is to develop knowledge about important aspects of psychosocial support in the Swedish health care system by exploring the experiences and perceptions of people with ABI and their close relatives. Participants were aged 18 years and older, and had met with a hospital social worker at least twice. Semi structured interviews were conducted with twenty-three individuals with acquired brain injury and ten interviews with close relatives. The interviews were analyzed using qualitative content analysis. Preliminary findings indicate the importance of person-centered psychosocial support at different stages of brain injury rehabilitation. Participants share a wide range of experiences of accessing and shaping of the psychosocial support. Participants in this study experience a need for hospital social workers who know the common characteristics of having an ABI, but who are also interested in the person on a personal level. The participants is in need of psychosocial support with different designs, especially crisis support, supportive counselling, counselling for the close relatives, information and some practical help. Preliminary findings also indicate a need of a distinct way to access psychosocial support when needed. Keywords: Acquired brain injury, psychosocial support, hospital social worker, user perspective.

284 Exploring Rehabilitation Practices for Language and Swallowing in Disorders of Consciousness: An Online International Survey

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ABSTRACT

Introduction: Patients with severe brain injuries and disorders of consciousness (DoC) are unable to communicate and often suffer from severe dysphagia. To address these challenges, the DoC Special Interest Group of the International Brain Injury Association (IBIA) developed a survey to identify the tools currently used by speech-language therapists, assess their needs, and explore new practices for improving the rehabilitation of language and swallowing in post-comatose patients.

Methods: The survey investigated (1) socio-demographic data, (2) general questions about speech and language therapy, (3) swallowing assessment and management, (4) language and communication assessment and management. The questionnaire was initially developed in English and subsequently translated into six other languages. It was distributed widely via the Alchemer platform. The survey was open to any therapist involved in language and/or swallowing rehabilitation of patients with DoC.

Results: Responses from 137 clinicians have been collected so far. Of these, the majority were speech therapists (74%). Most

respondents work in chronic rehabilitation centers (52%) or acute/subacute care settings (22%). During their academic studies, 27% of clinicians reported being exposed to post-comatose states, while 37% received formal training in the assessment and management of DoC during their professional careers. A significant proportion of therapists had experience assessing (74%) and managing (76%) swallowing disorders. Regular monitoring of swallowing function (93%) and providing guidance to patients' families on swallowing management (91%) were common practices, and approximately one third (36%) reported creating or adapting their own tools for swallowing assessment. Regarding language, most therapists assessed (80%) and managed (76%) communication in DoC patients. They frequently evaluated patients' ability to use augmentative and alternative communication (76%) and gathered information about patients' interests from family and friends (96%). Observing communication abilities across different contexts was also common (89%). Fewer therapists created or adapted tools for language assessment (31%) and management (53%). They also reported the tools they preferentially use in their practice for each clinical domain. After completing the survey, over 40% of therapists reported gaining new insights.

Conclusions: The survey highlights the lack of tools and training for speech-therapy practices in patients with severe brain injury and DoC. Early and long-term assessment and management of both language and swallowing abilities should be improved, notably by providing and/or adapting new clinical tools.

285 Aspects of Subconcussive Blast Exposure Associated with Differences in Brain Structure and Function

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ABSTRACT

A high proportion of military personnel are exposed to primary blast forces as part of training and/or combat. These forces can affect brain structure and function, resulting in concussive neurotrauma. However, most service-related blast exposures are considered subconcussive and do not result in overt clinical symptoms. Preclinical work suggests subconcussive exposures can affect brain structure and function in a similar manner to concussive exposures; however, this has not been demonstrated beyond the acute stage in humans. The primary objective of the current study is to identify the characteristics of subconcussive blast exposure associated with long-term differences in brain structure and function.

Participants included 107 US Military Veterans on average 10 years following deployment and without history of military-related traumatic brain injury (TBI). Blast exposure was evaluated using the Salisbury Blast Interview. Outcomes included ROI brain volumes and metrics describing aspects of the brain's functional connectome. Linear regression was conducted with brain volume and connectome metrics as the dependent variable. Blast exposure characteristics were evaluated in separate models including covariates (age, sex, intracranial volume). Cluster analysis was conducted to identify patterns of exposure associated with changes to brain structure and function. False discovery rate corrected for multiple comparisons.

Two broad patterns of results were observed. First, characteristics describing the average severity across exposures were related to aspects of the functional connectome including the Rich Club, lower average frequency at which communication occurs, and gamma bandwidth connections. These characteristics were also related to left middle temporal gyrus and hippocampal volume. Second, blast characteristics describing the frequency of exposures were related to connections in the theta bandwidth and left superior frontal gyrus volume.

Cluster analysis identified three groups: unexposed, mild, and moderate exposure. Group differences were present for the frequency at which communication occurs and connections in the gamma bandwidth, as well as left middle temporal gyrus and hippocampal volume. Post-hoc analyses revealed that the unexposed group differed from both exposed groups, but the exposed groups did not differ from each other.

Results demonstrate two patterns of long-term changes in the functional connectome and brain volumes, one associated with the average severity of blast exposures and one with the frequency of blast exposures. This contrasts with blast exposure more generally (including both concussive and subconcussive events) where maximum severity and close-range exposures are the strongest predictors. The current results demonstrate that negative outcomes are unlikely to occur after a single subconcussive event, likely due to the lower severity of these events. Repeated exposure to sufficiently severe events is likely required for neurological effects to be observed following subconcussive blast exposure. These results identify neurological differences associated with subconcussive blast exposure that can be investigated as potential pathways explaining alterations in clinical presentations.

286 Sex and Age-Specific Factors in Mild Traumatic Brain Injury Recovery: The Role of Brain Network Modularity in Females

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ABSTRACT

Traumatic brain injury (TBI) is the most common neurological disorder and poses a significant public health burden, with 60-95% of cases classified as mild traumatic brain injuries (mTBI). While mTBI affects both men and women across all age groups, research has historically focused on men, leading to limited attention on women-specific health concerns.

Females experience distinct physiological changes throughout their lives, including fluctuations in endogenous sex hormones and other biological processes not seen in males. These factors may affect their susceptibility to mTBI, recovery, and response to treatment. However, how age and physiological differences uniquely influence mTBI outcomes in females remains poorly understood.

The aim of this study was to examine sex-specific variations in brain network connectivity metrics and assess age-related differences in how these metrics influence recovery outcomes in females following mTBI. Four hundred forty-two adults (151 females) between 18 and 83 years old with Glasgow Coma Scale (GCS) scores 13-15 were included in this analysis. Data were collected as part of the prospective multi-center Transforming Research and Clinical Knowledge in TBI (TRACK-TBI) and downloaded from the open-access Federal Interagency Traumatic Brain Injury Research information system (FITBIR). Functional magnetic resonance imaging (fMRI) was performed within two weeks post-injury. Network connectivity was measured with graph theory-based metrics. Recovery outcomes at 12 months post-injury were assessed throughout the Rivermead Post-Concussion Symptoms Questionnaire (RPQ).

Initial analyses revealed that while clustering coefficient and characteristic path length were not significant, modularity at two weeks is a strong predictor of RPQ at 12 months (β=-10.809, p=0.001) in mTBI. Notably, females showed a stronger association between higher baseline modularity and fewer post-concussion symptoms compared to males (β=8.658, p=0.027). This biological sex difference prompted further focus on females, where age-specific patterns emerged. Younger females (17-34 years) showed a significant association between higher early-stage modularity and better recovery at 12 months (β=-13.625, p=0.002). In contrast, this association was not observed in females aged 35 and older.

While brain network modularity appears to be a key determinant of recovery in younger females, its diminished effect in older females suggests that additional factors, such as hormonal fluctuations throughout the lifespan, may also contribute to recovery outcomes. Nevertheless, these factors have not been collected in the large population cohort studies of TBI. These findings underscore a critical gap in mTBI research, highlighting the urgent need to explore sex-specific and age-related factors, such as hormonal fluctuations, pregnancy, oral contraceptive use, and the impacts of perimenopause and postmenopause. Addressing these factors in future studies will not only fill this gap but also open new avenues for improving our understanding of women's brain health in mTBI.

287 Step-By-Step Approach to Design an Evidence Based Intensive Physical Rehabilitation Program for Children and Adolescents with Acquired Brain Injury

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ABSTRACT

Background: Physical activity positively impacts physical, cognitive and social-emotional functioning in daily life, while also influencing the development of brain structure and function. Therefore, physical activity is considered as an active ingredient of interventions focusing on recovery in children and adolescents with acquired brain injury (ABI), with dosage of practice being recognized as an important factor in determining the efficacy of physical rehabilitation. To date, intensive physical rehabilitation is not yet part of routine daily practice. The aim of our REHABILITY-research program is to synthesize existing knowledge and to generate new knowledge to develop an evidence-based intensive physical rehabilitation program focusing on optimal recovery, functioning and participation in children and adolescents with ABI in the subacute phase.

Methods: In this research project we have adopted a step-by-step approach characterized by close collaboration among researchers, professionals, children and adolescents with ABI, along with their parents. Each stage of the project leverages existing knowledge and experience to inform subsequent steps.

The first phase involved the establishment of a foundation for future intervention studies, encompassing: I) a literature review, II) an international expert consensus study, and III) a qualitative study in children and adolescents with ABI and their parents. The findings from these studies were used to design a novel physical rehabilitation program (REHABILITY) in collaboration with relevant stakeholders (phase two). Finally, in the third phase a pilot study will be conducted to investigate the safety and feasibility of this intensive physical rehabilitation program in a single rehabilitation clinic for children and adolescents with ABI.
Results: The first phase revealed that the current body of evidence about physical rehabilitation in children and adolescents with ABI during the subacute phase is limited. International experts, children and their families expressed the need for a more intensive approach, sufficiently tailored to the individual needs of the patient and the family. Subsequently, a consensus-based framework was developed to design an intensive physical rehabilitation program. Principles of neuroplasticity with increased dosage of practice (frequency, intensity, time and type) in meaningful activities, and involvement of parents and siblings are essential components of this novel program. The program is currently being studied for its feasibility (January-December 2024).
Conclusion: Physical interventions during subacute rehabilitation have the potential to improve functional recovery in children and adolescents with ABI, with dosage of interventions as an important factor influencing its effectiveness. Through our program of research we now have an evidence and expert informed intensive physical rehabilitation program designed to challenge children and adolescents to achieve optimal recovery in functioning and participation after their brain injury.

288 Lorazepam For Emergence From A Minimally Conscious State And Management Of Spasticity In A Patient With Traumatic Brain Injury: A Case Report

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ABSTRACT

The GABAergic drugs, lorazepam and zolpidem have shown to produce paradoxical increased consciousness in patients with Disorders of Consciousness (DoC), however their effects on motor recovery and spasticity have not been well described.1,2 We highlight a case of emergence from a minimally conscious state (MCS) after initiation of lorazepam in a patient with traumatic brain injury (TBI) with accompanying improvements in movement initiation and spastic tone. An 18-year-old male was admitted to a DoC rehabilitation program with a history of severe TBI suffered four months prior with resultant spastic quadriplegia. Initial imaging had revealed bilateral hemorrhagic contusions, a left subdural hemorrhage, and a right parietal epidural hemorrhage requiring an emergent right temporoparietal craniotomy and a left fronto-temporoparietal decompressive hemicraniectomy with subsequent left cranioplasty. The patient's presentation was consistent with a MCS (CRS-R score 13) and management with amantadine and modafinil failed to improve arousal. A trial of lorazepam (2 mg) resulted in improved alertness and emergence from MCS (repeat CRS-R score 22). Scheduled lorazepam therapy (2 mg daily) resulted in an improved ability to move his thumb to answer yes/no questions and reduced spastic tone in bilateral upper extremities, allowing for discontinuation of baclofen therapy. It is theorized lorazepam and zolpidem hyperpolarize GABAergic neurons in the globus pallidus interna (GPi), relieving active inhibition of the central thalamus, and restoring thalamocortical activity.3 In this case, the marked improvement in motor planning and spastic tone with lorazepam was most similar to reports of emergence from MCS with catatonic features.4 The patient's injury pattern likely coincided with a density of striatal GABAergic neurons or GPi GABA-A receptors, resulting in an inhibitory-excitatory imbalance between striatal, thalamic, and cortical structures. Lorazepam was able to resolve the effects of deafferentation and terminate active inhibition by the GPi leading to marked improvement in arousal and spasticity.

289 Supporting Individuals with Traumatic Brain Injury (TBI) Through the Use of Digital Aids for Social Media: An In-the-Wild Study

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ABSTRACT

Background: Social media platforms like Facebook can help adults with traumatic brain injury (TBI) build social connections, reduce isolation, and access support networks. However, individuals with TBI use social media less frequently than their peers, often due to accessibility and usability challenges, as platforms are not typically designed with their needs in mind. Studies of social media use in adults with TBI have shown its benefits and challenges. Building on this knowledge, a Talk-Aloud study confirmed the benefits and challenges adults with TBI face on social media. The research team then employed participatory design methods to develop aids addressing cognitive and communication challenges online. A usability and feasibility study involving individuals with

TBI and rehabilitation professionals led to significant improvements based on feedback.
Objectives: This study explores how individuals with TBI utilize developed digital aids over several weeks while engaging with Facebook. Specifically, this work examines (1) user perceptions of five browser-based aids designed to modify Facebook's user interface (UI) and (2) the impact of these aids on users' social media experiences.
Methods: Thirty-nine individuals with TBI were recruited for a 4-6 week study. During this period, participants interacted with five distinct browser aids (e.g., Focus Mode) that adjusted various UI functions and visuals on Facebook to better accommodate TBI-related challenges, such as visual clutter and cognitive overload. Participants provided daily feedback on their experiences with each aid, along with pre-post surveys assessing their social media usage patterns, life satisfaction, and perceptions of social media post-TBI. Additionally, participants completed a final evaluation of the aids and overall study experience.
Results: Users with TBI generally found the aids beneficial, particularly those reducing visual clutter and information overload. Participants reported improved ease of use and comfort when interacting with Facebook, indicating that the aids mitigated some cognitive demands of social media use. A pre-post comparison showed increased life satisfaction during the study. However, participants also identified unmet needs that the current aids did not fully address, highlighting areas for further development. Reflections on the methodology underscored the challenges of conducting evaluations in naturalistic settings, providing valuable insights for future research.
Conclusions: This study demonstrates that browser-based aids designed to address the unique challenges faced by social media users with TBI can enhance their online experiences. The positive feedback from participants supports the potential for integrating similar functionalities into mainstream social media platforms. By doing so, these platforms could create more inclusive environments that allow users with TBI to engage meaningfully without the common barriers to participation. Future research should investigate additional features to address the evolving needs of this population, further refine the design of these aids for broader application, and explore their integration into rehabilitation settings.

290 Brain-Heart Interaction and Central Autonomic Network: Predicting Paroxysmal Sympathetic Hyperactivity via HRV in Acquired Brain Injury

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ABSTRACT

Background: Paroxysmal Sympathetic Hyperactivity (PSH) presents a significant challenge in managing Acquired Brain Injury (ABI), marked by unpredictable autonomic responses. This study leverages Heart Rate Variability (HRV) and machine learning to predict early autonomic changes before PSH episodes.
Methods: Four ABI patients, diagnosed with PSH using PSH-Assessment Measure (PSH-AM) scores, were continuously monitored using an FDA-approved ECG device (BioPatch - Zephyr Technology). The cohort included three Unresponsive Wakefulness Syndrome/Vegetative State (UWS/VS) patients with hemorrhagic, cardiac arrest, and traumatic brain injury etiologies, and one Minimally Conscious State (MCS) patient with hemorrhage. Fourteen PSH events were monitored. HRV metrics included SDNN, RMSSD, LF, HF, and VLF, alongside Multiscale Entropy (MSE) analysis to compute short- and long-scale Complexity Indices. A Support Vector Machine (SVM) classifier was trained to differentiate PSH from tachycardia (TCH).
Results: Significant increases in heart rate from 72 ± 5 bpm to 115 ± 10 bpm ($p < 0.01$) were observed before PSH episodes. While no significant changes in the LF/HF ratio were noted during or between PSH and TCH events, the VLF/(LF+HF) ratio significantly increased during PSH ($p < 0.05$), distinguishing it from TCH. Notably, the SVM classifier achieved 100% accuracy in predicting PSH events 10 and 20 minutes before their onset. This indicates that early detection is possible, with VLF and complexity indices being critical predictive biomarkers. Overall, the classifier achieved 93% accuracy in distinguishing PSH from tachycardia.
Conclusions: HRV analysis, particularly the VLF component and complexity indices, combined with machine learning, demonstrates a robust ability to distinguish PSH from tachycardia events not only during the episodes but also up to 20 minutes before their onset. This early differentiation can guide more timely interventions, improving clinical management of PSH in ABI patients. While this approach cannot predict PSH occurrence in advance based solely on HRV, it offers valuable insights into distinguishing these critical events from other autonomic dysfunctions. Further validation with larger patient cohorts is necessary to integrate this method into clinical practice.

291 Long-term Treatment Of Spasticity In Patients After Brain Injury With A Combination Of Botulinum Toxin And Independent Home Exercise

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ABSTRACT

Our department of Rehabilitation medicine deals with patients after brain damage. Spasticity is one of the very common complaints of patients after brain injury, both after stroke and traumatic brain injury(TBI). The application of botulinum toxin is one of the basic therapeutic procedures (1). We have been working according to the concept of Five Step Clinical Assessment (2). Patients are followed up regularly in individual application three- months cycles over several years. In the meantime, they practice on their own according to the instructions and keep a regular diary . We will present the results of our cohort in the years 2021 -2024. Fifty-four patients were followed for at least one year, 11 of them for 3 years. All were aged 18-80 years, and were post stroke or TBI. The earliest application and our follow-up started 3 months after the event. We treat spasticity of the upper limb (UL), lower limb (LL) or both together. In some patients we switch from UL to LL over a period of 3 years. We monitor the changes in spasticity per se (measured by the Tardieu scale), but also functional tests. In the case of UL, we use the Frenchay Arm Test (FAT), which helped in identifying the correct muscles for application, but at the same time we see functional improvement in fine motor skills as well as their better use in ADL. In the lower limb, in addition to the Tardieu scale, we also follow the 10-meter gait test. These measurements are controlled during each visit, before the application, 6 weeks after and three months after the previous application. The majority of patients (84%) improved in most of the monitored parameters within one year (3-4 cycles) not only in the period of the greatest effect of the injection (1-2 months after the injection), but practically never returned to baseline in the severity of spasticity. Patients who were followed for 2 to 3 years still showed improvement in individual parameters in 70 percent. Those who did not improve were examined in more detail, including nerve block, and some were referred for corrective surgery. Our results support the fact that motivated patients who are willing to perform daily home exercises according to the instructions in combination with regular botulinum toxin applications improve in the long term, even three years after the onset of the problem.

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292 Development of the Montreal Cognitive Assessment (MoCA) Observation Tool: A Mixed Methods Study

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ABSTRACT

Background: Acquired brain injury (ABI) may result in a variety of cognitive deficits. The Montreal Cognitive Assessment (MoCA) is one of many screening tools used to assess cognition; however, it does not adequately capture the executive dysfunction and behaviours commonly seen in this population, as it was not created specifically for ABI. The MoCA Observation Tool (MOT) was developed as an add-on to the MoCA, in attempt to capture some of the valuable dysexecutive and behavioural observations made by examiners while administering the MoCA.

Objective: This study aimed to assess the inter-rater reliability of the MOT in its current form, and to assess the opinions of interdisciplinary health care practitioners with respect to its usability in practice.

Methods: Following preliminary testing of the tool, multiple focus groups with an interdisciplinary health care team were conducted to further develop the MOT. The MOT included eight constructs, several of which had subcomponents, detailed as follows: processing speed (mini trails and total test time), attentional regulation (distractibility), perseveration (verbal and motor), behavioural regulation/disinhibition (impulsivity and expletive language), self-monitoring (overlooks mistakes, unaware of mistakes and estimation of performance), cooperation (needs encouragement and refuses task), response to task (not engaged, anxiety, anger/frustration, and other), and memory (category cueing and multiple choice cueing). To assess inter-rater reliability, 30 ABI patients and 11 interdisciplinary health care practitioners were recruited. Videos of the 30 patients completing the MoCA were obtained. The MOT was then applied to each video twice, by two different health care practitioners. Results were analyzed using percentages of agreement and kappa coefficients for each item. Afterwards, a Systems Usability Scale (SUS) was sent to the health care practitioners to assess their overall impression of the tool.

Results: The overall rate of agreement was 82% with the individual percentages of agreement for each item ranging from 53% to 97%. The overall kappa coefficient was 0.54 with individual kappa coefficients ranging from 0.07 to 0.87. Five of the items were scored too infrequently to calculate kappa coefficients. The mean SUS score was 77.08 (SD 12.56).

Conclusion: Results from this study helped further develop the MOT as a tool with acceptable inter-rater reliability. Furthermore, the SUS results indicate an overall positive

impression of the MOT with respect to its usability in practice. The MOT offers an objective way to capture valuable information about ABI patients' executive dysfunction and behaviours using a common cognitive assessment measure; information which can then help inform rehabilitation efforts and approaches to optimize function. Further research is required to assess validity.

293 Prediction of Anxiety and Depression Using Pre-Concussion Screening in Collegiate Athletes

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ABSTRACT

Accurately identifying mental health symptoms in student-athletes is critical for delivering timely and appropriate care. Previous research has demonstrated that 1 in 3 college students experience significant anxiety and depression symptoms (Adams et al., 2021). Among student-athletes, anxiety affects 30% of women and 25% of men; however, only 10% seek help (ACSM, 2021). The NCAA's 2020 well-being survey reported that rates of anxiety, depression, and mental exhaustion among athletes have increased 1.5-2x compared to pre-COVID-19 levels (NCAA, 2022), emphasizing the increasing severity. These findings highlight the growing mental health burden on student-athletes and identify the need for practical screening tools. Baseline concussion testing, such as the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT), could serve as a valuable tool for identifying athletes at risk for anxiety and depression. This study investigates the utility of ImPACT as a mental health screening tool. The sample included 601 varsity and club college athletes from a mid-sized university in the Southeast region of the US (47.3% female; 16% ADHD). Symptom clusters, a grouping of related symptoms that help categorize and assess an individual's mental health, were evaluated using the ImPACT tool. Affective symptoms included nervousness and sadness; sleep symptoms captured disruptions in sleep patterns; cognitive symptoms assessed difficulty concentrating and feeling mentally foggy; and physical symptoms included headaches and dizziness. Anxiety levels were measured using the Generalized Anxiety Disorder-7 (GAD-7) scale, and depression was assessed using the Patient Health Questionnaire-9 (PHQ-9). Regression analyses were conducted that examined symptom clusters to predict anxiety and depression. Gender and ADHD were also evaluated as potential predictors in these analyses. Of the athletes, 49.5% reported no depression, 14.8% had mild depression, 12.4% had moderate depression, and 6.2% experienced severe depression. For anxiety, 55.3% reported no anxiety, 13.1% experienced mild anxiety, 8.4% had moderate anxiety, and 6.7% had severe anxiety. Hierarchical regression analyses revealed that gender and ADHD explained a small but significant portion of the variance in depression (R^2change = .029, $p < .001$). The affective (R^2change = .226, $p < .001$), sleep (R^2change = .040, $p < .001$), and cognitive clusters (R^2change = .018, $p < .001$) contributed substantially to the overall variance (31.2%). Similarly, the model for anxiety explained 29.4% of the variance, with significant contributions from ADHD, gender (R^2change = .035, $p < .001$), and the affective cluster (R^2change = .259, $p < .001$). These results suggest that ImPACT concussion symptom scores may serve as a practical preemptive screening tool for anxiety and depression in collegiate athletes. Integrating mental health evaluations into concussion protocols could provide and improve timely interventions and support for the psychological well-being of student-athletes.

295 Prevalence Of And Factors Associated With 12-Month Absence From Work In People With Mild Traumatic Brain Injury In Europe

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ABSTRACT

Background: There is a scarcity of multi-country data about employment following mild traumatic brain injury (mTBI). Therefore, this study aimed to investigate the absence from work in the 12 months after mTBI in Europe.

Methods: European prospective and longitudinal data from the Collaborative European NeuroTrauma Effectiveness Research in TBI project (CENTER-TBI) were used. TBI occurred between December 2014 and December 2017, and mTBI was defined as an at-accident Glasgow Coma Scale (GCS) score higher or equal to 13. The sample consisted of adults working at the time of injury. Variables included sociodemographic factors, variables related to the use of psychoactive substances, pre-injury medical history, factors related to medical care, complications, and discharge, and scores collected at a two-week follow-up. Associations were assessed using generalized linear mixed-effects models.

Results: There were 729 working-age adults included in the study (median [IQR] age: 44 [23] years; 528 [72.4%] men). The median (IQR) number of pre-injury chronic physical conditions was 0.0 (1.0), while 73 (10.1%) of the sample had a pre-injury psychiatric disorder. Median (IQR) at-accident GCS score was 15.0 (1.0). The absence from work (and change of work, return to previous work at reduced levels, and special employment) at two weeks and three, six, and 12 months was 36.0% (11.6%), 30.1% (14.8%), 24.7% (12.6%), and 23.8% (12.7%) (p-value for changes in absence from work <0.001).

Absence from work in the 12 months following traumatic brain injury was statistically associated with age (per one-year increase: OR=1.04, 95% CI=1.01-1.07), current tobacco use (OR=2.05, 95% CI=1.00-4.17), number of pre-injury chronic physical conditions (per one-condition increase: OR=1.44, 95% CI=1.01-2.04), pre-injury psychiatric disorder (OR=5.48, 95% CI=1.79-16.75), Injury Severity Score (per one-point increase: OR=1.09, 95% CI=1.06-1.12), and the two-week Quality of Life after Brain Injury (QOLIBRI) score (OR=0.98, 95% CI=0.96-1.00).
Conclusions: Absence from work was frequent in the year following mTBI in this European population. The study strengthened the importance of age, pre-injury health behaviors, pre-injury physical and psychiatric comorbidity, overall injury severity and the early perception of health-related quality of life in predicting absence from work after mTBI. Based on these findings, measures should be undertaken to improve post-mTBI return to work in Europe.

296 how is Youth Concussion 'Recovery' Represented in Health and Rehabilitation?: Results from a Critical Conceptual Review of the Literature

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ABSTRACT

Background: Youth concussion recovery is variably described as 'unique', 'individual', and 'unpredictable', yet the concept itself is rarely defined, and little scholarship has been directed toward understanding what recovery 'is' (e.g., what recovery looks like, what constitutes a 'good' or 'full' recovery, how youth understand their own recovery). This omission represents a major gap in knowledge of youth concussion with significant implications for the development and delivery of clinical supports and services.
Method: Combining a structured critical conceptual review with elements of critical interpretive synthesis methodology, we examined fifteen texts (e.g., empirical studies, clinical guidelines) published between 2018 and 2023 that implicitly and/or explicitly conceptualized youth concussion 'recovery'. Our approach was grounded within a Foucauldian theoretical orientation that enabled us to consider the literature not as the self-evident 'truth' of concussion 'recovery' but as an object of inquiry in of itself. Accordingly, we approached the literature with an eye toward identifying and examining the patterned ways of speaking, thinking, and acting (i.e., discourses) that were produced and reproduced across texts to the extent that they appeared as 'just the way things are'. Our review was framed by the following questions: how is youth concussion 'recovery' conceptualized in the health and rehabilitation literature?, what taken-for-granted assumptions underlie what 'recovery' is represented to be?, what are the potential effects of such assumptions on youth and their families, and on how youth concussion is intervened upon in health and rehabilitation? Our team-based approach to analysis was informed by our Foucauldian theoretical orientation.
Results: Through our critical analysis, we identified what we term 'a dominant narrative of youth concussion recovery'. Central to this narrative is the representation of 'recovery' as progressing along a predetermined timeline beginning at the time of injury and ending with a return to 'normal'. Within this narrative, youth and their families are expected always to be working toward the endpoint of normality. Our analysis suggests that this dominant narrative was rarely questioned across reviewed texts. Drawing on illustrative examples from the reviewed texts, we demonstrate the ways in which 'recovery' - as currently conceptualized - is a reductive ableist concept that perpetuates harmful assumptions about the sorts of bodies and childhoods that are valued in contemporary society.
Implications: This work suggests that conceptions of recovery ought to engage more directly with the experiences and perspectives of youth. Future research in this area has the potential to shift clinical practices in ways that are attuned to life after concussion (e.g., away from 'recovering normal' and toward adjusting or adapting to life with symptoms).

297 Feasibility of a High-Intensive Physical Rehabilitation Program for Children and Adolescents with Acquired Brain Injury in the subacute phase

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ABSTRACT

Background: Principles of neuroplasticity and motor learning emphasise the potential of high dosage of physical rehabilitation in children and adolescents with acquired brain injury (ABI) during the subacute phase. Clinical research is needed to investigate adequate dosage of physical rehabilitation and its effects on outcome with reliable and valid outcome measures.

The aim of this feasibility study is to investigate the safety and feasibility of a high-intensive physical rehabilitation program to improve functioning and participation in children and adolescents with ABI, and to evaluate the feasibility of a coreset of clinical outcome measures for objective assessment of recovery on relevant ICF-domains during the subacute rehabilitation phase.
Methods: A feasibility study was launched on January 1, 2024 using a prospective case-series design. All children and adolescents between 6-18 years of age with ABI, admitted to the inpatient department at De Hoogstraat Rehabilitation, Utrecht The Netherlands, were included. The physical rehabilitation program included a system approach with intensive involvement of parents to reach 3-5 hours physical rehabilitation per day. Physical rehabilitation encompassed planned therapy sessions (physiotherapy, occupational therapy, sports therapy) and supervised and unsupervised physical activities. Standardized measures were used to map physical activity (accelerometery) and fatigue (real-time fatigue scores[RTFS]) along with a coreset of clinical outcome measures for recovery of motor and cognitive functioning (Post-Acute Level of Consciousness Scale (PALOCs), Canadian Occupational Performance Measure (COPM), Gross Motor Function Measure-66 (GMFM-66), 6-Minutes Walking Test (6MWT), Action Reach Arm Test (ARAT) and Cognitive and Linguistic Scale (CALS)) during each individual rehabilitation trajectory. We used process indicators to evaluate the safety and feasibility of this novel approach.
Preliminary Results: To date, 10 participants (mean age 12.3 years, range 6-18 years)) have completed our program with an average of 3.2 hours/day (range 0.5-7.5) of physical rehabilitation. Fifty percent of the participants met the target of 3h/day, with limited consciousness and family availability identified as limiting factors. No adverse events were reported. The coreset of clinical outcome measures was fully administered, however the GMFM and ARAT were found to have limited clinical relevance. All participants demonstrated improvement, with discharge scores exceeding admission scores across all measures, and no adverse effects were observed.
Conclusion: Preliminary results indicate that high-intensive physical rehabilitation during the subacute phase is safe for children and adolescents with ABI. The level of consciousness and family availability may limited the ability to increase the intensity in the early phase of recovery. Therefore the use of standardized outcome measurements is valuable for gaining insights into these factors and supporting clinical decision-making, as well as for assessing recovery of motor and cognitive functioning during subacute rehabilitation for children and adolescents with ABI.

299 "But. . .I Don't Feel Recovered": Results from a Multimedia Storytelling Project Exploring Youth Conceptualizations of Concussion Recovery

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ABSTRACT

Background: The ways that youth concussion 'recovery' is conceptualized play a central role in shaping the health and rehabilitation supports and services that are offered to youth following concussion. In earlier research, our team conducted a critical conceptual review of clinical guidelines and empirical studies in the field of youth concussion. Notably, our review found that the perspectives of youth concerning concussion recovery were largely absent. Furthermore, our results illustrated how dominant ideas about youth concussion recovery have been constructed in narrow terms (e.g., as a return to 'normal' function) and in ways that place responsibilities on youth and their families to 'recover' along a predictable path and timeline. To begin to address these concerns, we aimed to expand understandings of youth concussion recovery (e.g., what recovery 'is', what it looks like, what constitutes a 'successful' recovery) through research that centered the perspectives of youth themselves.
Methods: Using a multimedia storytelling method, we engaged six youth who had sustained concussion (18-24 years of age) as expert 'storytellers'. Working alongside multimedia professionals in a series of online group workshops, participants were supported to create their own stories of 'recovery'. Specifically, each youth storyteller co-produced a short film detailing their experiences and understandings of concussion recovery and participated in a follow-up interview. Our team-based approach to data analysis was oriented by a series of critical interrogative questions of the data (films, observations, reflexive fieldnotes, and interviews) such as: what (if any) taken-for-granted assumptions underlie the conceptualization of concussion 'recovery' represented in the data?, whose perspectives are privileged in this representation and whose are silenced, discounted, or left out?, what alternative conceptualizations of concussion 'recovery' are suggested ? This analytic framing was informed by a Foucauldian theoretical framework developed in the context of our team's earlier research.
Results: Drawing on representative data, including the films themselves, we demonstrate the ways in which youth stories contributed nuanced and complex understandings of concussion 'recovery' that both align and diverge from dominant

constructions of recovery as a return to normal (e.g. concussion recovery as living well with symptoms, concussion recovery as returning to a 'new normal').
Implications: This research suggests new lines of inquiry including exploring the hidden work that youth engage in to adapt to life after concussion. Moreover, this research suggests there is a need to work in direct collaboration with youth toward developing actionable recommendations for advancing concussion treatment and supports in ways that are attuned to the real-world needs and priorities of youth.

300 The Vanishing of the ACoA Syndrome After Aneurysmal Subarachnoid Hemorrhage

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ABSTRACT

Historically, a specific set of symptoms has been related to the rupture and repair of anterior communicating artery (ACoA) aneurysms. These consequences were defined as the 'ACoA syndrome' and included observations of severe memory loss, confabulation and personality or behavioral changes. These observations correspond to neuropsychological impairments in memory, executive functions and social cognition. However, in more recent studies, the existence of such a distinct syndrome has been called into question. First, we aimed to investigate the existence of the ACoA syndrome in a group of patients who suffered an aneurysmal subarachnoid hemorrhage (aSAH), by investigating differences in neurocognitive funtions between patients with and without ACoA aneurysms. Secondly, we systematically reviewed the literature from the first mentioning of the ACoA syndrome until 2022.
Methods: Data of a consecutive cohort of 88 patients with a confirmed diagnosis of aSAH, who were admitted to the University Medical Center in Groningen (UMCG) between 2010 and 2012 were re-examined to answer the present research question. Around 6 months post-SAH, three neurocognitive domains were investigated using neuropsychological tests: memory, executive functions and social cognition. Scores of SAH patients with ACoA aneurysms (N = 28) were compared to patients with aneurysms in other locations (N = 66). Subsequently, a systematic review of the existing literature on the ACoA syndrome was performed using Embase and PubMed until October 2022. Studies that investigated cognitive functions after rupture and repair of ACoA aneurysms were included.
Results: No significant difference in the proportion of patients with impaired performance on all tests for neurocognitive functions between the ACoA and non-ACoA group was found (all ps > .05). Second, the systematic search yielded 847, 199 full-text articles were assessed for eligibility and 55 articles were included. Evidence was found for the ACoA syndrome in studies between 1960 and 2000, with impairments in memory and executive problems in the majority of studies. However, the majority of studies from 2000 did not demonstrate a distinct ACoA syndrome, although neuropsychological measurements (for instance for social cognition) improved.
Conclusion: The ACoA syndrome seems to 'vanish' over time. This vanishing coincides with changes in the management of ACoA aneurysms over the past decades, such as the emergence of endovascular treatment and improvement of neurointensive care. Therefore, we hypothesize that the management techniques of ACoA aneurysms until around 2000, i.e. mainly conventional clipping, could be related to the presence of symptoms of the ACoA syndrome several decaded ago. Given this possible association and the negative effects of neurocognitive impairments on daily functioning, cognitive outcome deserves to be weighted as an outcome measure, next to more traditional factors such as neurological outcome and survival.

301 Understanding The Healthcare Needs of Uninsured Individuals With Brain Injuries In The United States

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ABSTRACT

Introduction: Brain injury is an unexpected event that can drastically alter a person's life, leading to loss of employment, housing, transportation, independence and social support. In the United States (U.S.), insurance status determines a person's ability to access healthcare services, ranging from emergency care to preventative services. Following a brain injury in the acute care setting, uninsured persons are more likely to be discharged home and less likely to receive follow up care or rehabilitation, leaving unmet healthcare needs. Individuals who do not have insurance or benefits, such as social security, are not recognized. The aim of this session is to describe the population of uninsured patients with brain injuries served by free rehabilitation clinics in the U.S.
Methods: Colorado, Georgia, and Texas have formed free clinics whose mission is to provide outpatient rehabilitation care, each called the Rehabilitation Services Volunteer Partnership (RSVP) Clinic, whose mission is to provide outpatient rehabilitation care for patients with brain injuries, among other rehabilitation diagnoses. We will report the demographics of individuals attending the free clinic and describe the population of individuals who have experienced catastrophic injury, yet do not have insurance or access to resources.
Results: The states of Colorado, Georgia, and Texas have developed a clinic model to provide needed care to individuals who experience brain injuries and do not have insurance. We will report the demographics of individuals attending the free

clinic and describe the population of individuals who have experienced catastrophic injury, yet do not have insurance or access to resources. We will provide insights on how these patients without access to care are living and their goals and needs when they attend clinic. We will describe patients attending these clinics and how they have been impacted by state policies related to Medicaid expansion and injury waivers.
Conclusions: The RSVP Clinic offers opportunity to observe the "invisible" population of individuals who experience brain injuries but are unable to access necessary follow-up care and rehabilitation services. A free volunteer-run outpatient rehabilitation clinic is feasible and can contribute to improved outcomes for uninsured individuals with brain injury. Further research to understand the impact on patient outcomes is needed.

302 Detecting Brain Injury After Subarachnoid Hemorrhage: A Comprehensive Assessment of White Matter Abnormalities, Volume Changes, and Cortical Superficial Siderosis and their associations with cognitive impairment

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ABSTRACT

This research aims to investigate various forms of brain injury following subarachnoid hemorrhage (SAH) by conducting three distinct studies using different advanced MRI techniques, focusing on cerebral parenchymal and ventricular volume changes, white matter abnormalities, and cortical superficial siderosis (cSS), and their associations with cognitive impairment.
Methods: The studies are part of the ICONS (Imaging, Cognition and Outcome of Neuropsychological Functioning After Subarachnoid Hemorrhage) study. Analyses were performed five months post-ictus. The first study involved volumetric assessments of 17 patients with aneurysmal SAH (aSAH) and 21 patients with angiographically negative SAH (anSAH), along with 15 healthy controls, using an automated segmentation tool to evaluate cerebral parenchymal and ventricular volumes. In the second study, 34 patients with aSAH, 24 patients with anSAH, and 17 healthy controls underwent diffusion kurtosis imaging (DKI) to assess white matter abnormalities and cognitive functioning. In the third study, 49 patients with aSAH and 24 with anSAH underwent susceptibility-weighted imaging (SWI) to assess the prevalence of cSS. Neuropsychological tests were administered across all analyses to evaluate cognitive domains, including memory, attentional control, and executive functioning.
Results: Lower frontal lobe volumes were associated with cognitive deficits in aSAH and anSAH groups, with significant correlations for psychomotor speed ($U = 81$, $p = 0.02$) and attentional control ($t = 2.86$, $p = 0.004$) observed. Additionally, larger lateral ventricular volumes were associated with poorer memory performance ($t = 3.06$, $p = 0.002$). DKI revealed significant white matter diffusion abnormalities in the aSAH group, while no significant differences were found in the anSAH group. Overall, white matter abnormalities were not significantly correlated with cognitive impairments in either SAH group. Lastly, cSS was identified in 96% of aSAH and 63% of anSAH patients, however, no significant associations were found with cognitive deficits.
Conclusions: In summary, the findings emphasizes that both neuropsychological assessments and neuroimaging markers are essential in identifying brain damage following SAH, yet they provide different insights into the severity of cognitive impairments. The lack of correlation between these measures indicates that neuroimaging alone cannot capture the complexity of cognitive outcomes, necessitating a comprehensive evaluation that integrates neuropsychological assessments. These evaluations are crucial for understanding the multifaceted nature of cognitive deficits, which can significantly affect daily functioning and quality of life. Therefore, incorporating thorough neuropsychological assessments into standard care protocols is vital for tailoring intervention strategies, addressing cognitive and emotional challenges, and enhancing overall patient management following aSAH and anSAH.

303 Rethinking Communication Strategies in Stroke Patients: Insights from Angiographically Negative Subarachnoid Hemorrhage

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ABSTRACT

Effective communication with stroke patients requires balancing optimism regarding recovery with transparency about potential long-term outcomes. In a subtype of stroke, angiographically negative subarachnoid hemorrhage (anSAH),

patients often receive an overly optimistic prognosis due to favorable immediate (neurological, physical) outcomes. This study examines the prevalence of cognitive impairments, emotional distress, and vocational changes post-anSAH.
Methods: 54 patients (mean age: 53.1 years, SD: 9.1; 26 females) were assessed 4.8 months post-ictus. Neuropsychological tests assessed five cognitive domains: information processing speed, memory, complex attention, executive functioning, and social cognition. Questionnaires assessed executive problems, anxiety, depression, and vocational changes.
Results: Cognitive impairments were identified in 51% of patients, with memory and executive functioning most affected. Executive problems were reported by 22.2% of patients, anxiety by 24.5%, and depression by 20.8%. Vocational functioning was disrupted in 70% of patients.
Discussion: These findings challenge the view of anSAH as benign, revealing significant cognitive and emotional issues and vocational difficulties during the subacute stage. Miscommunication about prognosis may lead to unrealistic expectations, frustration, and psychological distress.
Conclusions: We advocate for clearer communication strategies, comprehensive education, and early neuropsychological assessments to support patient reintegration and improve quality of life.

304 Recommendations Regarding Return to Play Following Concussion for Children Aged 3-12 Years: A Scoping Review

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ABSTRACT

Play is a crucial part of a child's identity and as such has been recognized by the United Nations Convention on the Rights of the Child that all children have the right to engage in play. Play provides many physical, psychological, social, and emotional benefits, and is especially important during the pre-school (ages 3 to 4 years) and school-aged (ages 5 to 12 years) years. A variety of play opportunities including unstructured (or child-led) play and structured (or adult-led) play are recommended for healthy development. After experiencing concussion, physical and cognitive symptoms can impact how children safely reengage in play. Given the risk for all children to experience concussion, there is ample research related to pediatric concussion including its symptoms, and return to school and return to play recommendations. Following concussion, it is recommended that children follow defined and evidence-based protocols to return to play. However, oftentimes the 'play' emphasized in these protocols is specific only to sport. To date, there is a lack of exploration and consolidation of post-concussion return to play recommendations that encompass the broad play experienced by children aged 3 to 12 years.
Objectives: The purpose of this scoping review is to determine the extent of and summarize the literature regarding recommendations for returning to play following a concussion for children aged 3-12 years.
Methods: The Preferred Reporting Items for Systematic reviews and Meta-Analyses protocol extension for Scoping Reviews was followed for this review. Studies were included if they: 1) included participants aged 3-12 years who have had a concussion; 2) included formal or informal intervention for returning to play following concussion; 3) were published in a peer-reviewed journal; and 4) were available in English. Six databases were searched.
Results: 20,248 articles were initially and 8,7469 duplicates were removed using Covidence, totalling 11,499 articles to be reviewed. 267 studies were eligible for full-text review and 15 papers met the eligibility critera after full-text review. Based on preliminary data extraction, 53% (n=8) of studies were conducted in Canada, 67% (n=10) were published between 2010 and 2020 and 53% (n=8) were cohort studies. Prior to returning to play, studies recommended activity restrictions (n=4), medical monitoring and management (n=4), gradual return to physical activity (n=4), identification of co-morbidities (n=2), active rehabilitation (n=2) and objective testing (n=1).
Implications: This research provides a consolidation of the play literature which is important in determining what post-concussion evidence-based recommendations are known for this age group. This research also explores the type of play (e.g., unstructured) and context (e.g., school) in which the play is occurring, which is essential for identifying gaps and informing future recommendations for returning to play.

305 Self-Awareness of Cognitive Performance in Virtual Reality after Traumatic Brain Injury

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ABSTRACT

Background: Individuals with moderate or severe traumatic brain injury (TBI) often experience persistent cognitive

difficulties, including impaired self-awareness. Measures of self-awareness typically include structured interviews, clinician ratings, self-proxy discrepancy, and performance-based discrepancy. Virtual reality, increasingly used with individuals with TBI, offers a promising context to assess self-awareness via performance-based discrepancy in tasks that resemble daily life in a controlled environment.

Objectives: This study aimed to (1) compare individuals with moderate-severe TBI and matched healthy controls on self-awareness in a virtual reality multitasking scenario, and (2) to explore associations between self-awareness and age, TBI severity (posttraumatic amnesia duration), and self-reported prospective memory, retrospective memory, and executive functioning within the TBI group.

Methods: The sample included 15 adults with moderate-severe TBI (20% female; mean of 43.5 years; mean of 80 months post-TBI) and 15 matched control participants. Participants completed the Virtual Multitasking Test (VMT), a non-immersive virtual test including three planned tasks (putting away the groceries, preparing a meal using, setting up the table) and several unplanned tasks in a six-room virtual apartment environment. Self-awareness was measured by the performance-based discrepancy score between subjective and objective performance on the VMT. Subjective performance was assessed via a custom questionnaire. Participants also completed the Prospective and Retrospective Memory Questionnaire (PRMQ) and the Dysexecutive Questionnaire (DEX).

Results: For the first objective, the subjective performance of both planned and unplanned tasks in the VMT tended to be rated better than the objective performance by the TBI group as well as the control group, resulting in a higher self-awareness performance-based discrepancy score for both groups. There was no significant between-group difference on this score for planned tasks ($p = 0.595$, $d = .258$). However, there was a significant difference on self-awareness for unplanned tasks ($p = 0.009$, $d = 1.045$), with the TBI group presenting a higher mean performance-based discrepancy score, indicating a stronger tendency to overestimate their VMT performance than the control group. For the second objective, the self-awareness performance-based discrepancy score did not correlate significantly with age, duration of posttraumatic amnesia, or the PRMQ or DEX scores ($\rho s < .44$; $ps > .10$).

Conclusions: Using performance-based discrepancy in virtual reality could complement other methods to yield a broader profile of self-awareness after TBI. Future studies should explore whether human-computer interactions and other measures of user experience in virtual reality, such as sense of presence, cognitive load, and engagement, are associated with self-awareness.

306 Understanding Rehabilitation for Consciousness Disorders in Latin America: Preliminary Results from a Survey of Healthcare Professionals.

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ABSTRACT

Recent guidelines on disorders of consciousness (DoC) propose strategies to enhance care; however, an international survey reveals that many recommendations are inadequately implemented, and treatment structures are insufficient. Neurorehabilitation practices vary by region and are not applicable to countries with less stable healthcare systems. In Latin America (LA), there is a lack of information on current clinical practice and could be key to improve DoC management in the region.

The aim of this study was to explore the availability of treatment facilities and current clinical practices in LA regarding the neurorehabilitation of pediatrics and adults with DoC.

Methods: An online survey (RedCap) was completed by 103 health professionals from 11 countries in Latin America. It was distributed through scientific societies in 21 countries and included 42 closed questions on demographic data, knowledge, professional practice and access to rehabilitation treatment. Descriptive statistics were generated from the responses.

Results: The survey was primarily conducted in Spanish (90.6%) respondents. Mean age of 42 years (SD = 10), and 70.7% female. The mean experience was 10 years in DoC. Key countries represented were Argentina (58%), Mexico (17%), and Brazil (10%), with 52% being physicians.

54% of respondents treat patients with 3 to 12 months of injury and 39% treat them in rehabilitation centers. Familiarity with clinical practice guidelines was noted by 44%, and 80% implemented them fully or partially. About 39.4% had structured programs for treating DoC patients, while 16.8% were in the implementation phase.

35.4% responded that the length of stay in rehabilitation is 3-6 months. Diagnostic evaluations included clinical history reviews (87%), structural imaging (71%), standardized behavioral tests (78%), and general assessments (93%). The Coma Recovery Scale-Revised (CRS-R) was the most used standardized scale (54.5%).

Pharmacological interventions included medications for spasticity (76%), central nervous system stimulants (44%), pain

control (58%), and wakefulness enhancers (52%). Non-pharmacological interventions were primarily physical therapy (89.1%), occupational therapy (75.2%), and speech therapy (81.2%). Professionals had access to both high-tech (40%) and low-tech technology devices (66%).
The most common discharge destination was home (75%), with 78% continuing rehabilitation at home or in outpatient settings. Follow-up care preferences included clinic visits (53%) and teleconsultations (9%). Assistive products commonly used were wheelchairs (89.1%) and personal care devices (73.3%).
Primary caregivers were often involved through educational sessions (73.3%), with 70% providing formal training. Family members mainly assumed caregiver roles (46%). Key challenges included resource shortages (69.3%) and limited access to specialized programs (57.4%).
Conclusions: This survey reveals significant gaps between clinical practice guidelines and actual rehabilitation of individuals with DoC in LA. Despite familiarity with these guidelines, resources and limited access to specialized programs impede effective treatment. Most patients return home after discharge, emphasizing the need for effective home-based rehabilitation strategies.

307 Outcomes of Elderly Patients on Direct Oral Anticoagulants (DOACs) Versus Warfarin After Traumatic Brain Injury

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ABSTRACT

Background: Prior studies have demonstrated the improved safety profile of direct oral anticoagulants (DOACs) over warfarin. However, outcomes among elderly traumatic brain injury (TBI) patients on DOACs remain unknown. In this study, we sought to describe how anticoagulation status (DOAC versus warfarin use) is associated with the rates of intracranial hemorrhage (ICH), hematoma progression, need for surgical intervention, and mortality in elderly TBI cases.
Methods: We performed a retrospective cohort study from 2014-2019 which included all trauma patients >65 years on either warfarin or DOACs at the time of injury. The primary outcome was the rate of ICH after TBI. Multivariable regression analysis identified independent predictors of functional dependency and mortality.
Results: A total of 501 elderly TBI patients (mean age = 82) were included. Warfarin users had higher CT Marshall scores (p=0.007), more severe TBI (GCS<8) (p=0.003), and higher rates of subdural hematomas compared to the DOAC group (p=0.003). Patients on DOACs had lower rates of ICH (42% vs 57%, p=0.001) and hospitalization (30% vs 41%, p=0.013), and better GOS- E scores at hospital discharge (mean 6.98 vs 6.41, p=0.005). Multicompartment ICH (OR 2.30, p= 0.027) and longer hospitalization (OR 0.04, p<0.001) were associated with higher functional dependency rates, while higher CT Marshall scores (OR 1.09, p<0.001) and poorer baseline frailty status (OR 0.62, p=0.026) predicted increased mortality risk.
Conclusion: In this retrospective cohort study, elderly TBI patients on DOACs had lower rates of ICH, lower need for hospitalization, and better functional outcome at discharge compared to those taking warfarin. These findings will benefit from further confirmation using prospective multicenter studies.

309 The Cumulative Impact of Traumatic Brain Injuries and Disruptive Behaviour Disorders on Brain Development in Children

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ABSTRACT

Introduction: Girls and boys presenting disruptive behavior disorders (DBDs) display differences in white matter microstructure (WMM) relative to typically developing (TD) sex-matched peers. Boys with DBDs are at increased risk for traumatic brain injuries (TBIs), which are also known to impact WMM. This study aimed to disentangle associations of WMM with DBDs and TBIs, and understand their potential cumulative effect.
Methods: The sample included 673 children with DBDs and 836 TD children, aged 9–10, from the Adolescent Brain Cognitive Development Study. Thirteen white matter bundles previously associated with DBDs were the focus of study. Analyses were undertaken separately by sex, adjusting for callous-unemotional traits, attention-deficit hyperactivity disorder, age, pubertal stage, IQ, ethnicity, and family income.
Results: Boys and girls with DBDs were at higher risk of TBIs compared to TD children. Among children without TBIs, those with DBDs showed sex-specific differences in WMM of several tracts relative to TD children. Among girls and boys with DBDs, those who had sustained TBIs displayed WMM alterations compared to non-injured children with DBDs. These differences were robust to adjustment for all covariates. In contrast, no differences in WMM were apparent when comparing brain-injured against non-injured TD children. Across most DBD/TD comparisons, measures of axonal density were higher among children presenting DBDs.
Discussion: In conclusion, in this community sample of children, we demonstrated unique patterns of WMM alterations

associated with the presence of DBDs, TBIs, and the combination of both conditions. Our results suggest that both boys and girls with DBDs are at higher risk of sustaining TBIs, which are associated with additional sex-specific alterations of WMM that further compromise their brain development. Given that TBIs are potentially preventable, and intervention techniques are known to decrease the burden of DBDs, our results have important implications for future targeted interventions.

310 Fatigue and Sleep Disturbance after Mild Traumatic Brain Injury Relative to Well-matched Trauma Control Participants

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ABSTRACT

Fatigue and subjective sleep disturbance are elevated after mild traumatic brain injury (mTBI). This raises the question of whether mTBI-specific factors contribute to the experience of fatigue and subjective sleep disturbance after mTBI. A group of 110 pre-morbidly healthy individuals who had been hospitalised with a traumatic accident approximately 8 weeks prior were examined. Participants were assessed with subjective measures of fatigue and sleep disturbance, psychological distress and pain. Individuals who had suffered a traumatic injury reported significantly greater fatigue and subjective sleep disruption than community-based control participants (n=45). After controlling for pain, psychological status, sex and premorbid level of functioning, those individuals who had suffered a mTBI in addition to their systemic injury (n=64) had equivalent levels of fatigue and subjective sleep disruption as those who had experienced no head injury at time of systemic injury (n=46). Trauma group membership did not significantly predict fatigue or subjective sleep disturbance. In contrast, psychological distress consistently predicted fatigue and subjective sleep disturbance, with pain also inconsistently predicting some fatigue and subjective sleep disturbance variables. This study suggests it is the experience of suffering systemic traumatic injury, rather than mTBI-specific factors, that is associated with elevations in fatigue and subjective sleep disturbance, approximately 8 weeks after injury.

311 Evaluating an Anthology Regarding the Impact of Concussions On the Lives of Women

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ABSTRACT

The psychiatric recovery process of Women with traumatic brain injury (WwTBI) is a subject that has insufficient scientific evidence and analysis. Optimizing the management of WwTBI, requires collection and analysis of lived experiences including the psychosocial impact on those affected. We were asked to evaluate a unique literary anthology (LA) written by prestigious women authors with lived experiences of TBI. With our previous experience in analyzing qualitative data amongst athletes through interviews and our documentary (A Dark Room) we felt that applying a similar iterative process to this anthology could serve as a template for understanding future narrative collections. Using a qualitative approach the St. Michael's Hospital Brain Injury Clinic team approached 152 potential participants, of which 8 consented and 6 completed the protocol. Two participants withdrew from the study. Two focus groups were established which were composed of researchers and patients from the psychiatry clinic. Questionnaires, individual and group interviews were conducted pre and post reading the LA. The recordings and questionnaires were transcribed into written data. The collective data was then coded using the Braun & Clarke 6 step framework for thematic analysis. We then connected with the authors to see if the themes we developed coincided with the authors' interpretation of the LA. We were able to determine a pattern of consistency between what authors wanted to portray and what readers were intended to understand. We can recommend this template as a repository of themes for future knowledge translation (KT) activities with the hope of providing more impactful care for WwTBI.

312 Linking TBI Symptom Inventories Using Semantic Textual Similarity

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ABSTRACT

One of the common tools used in both research and clinical practice for traumatic brain injury (TBI) is symptom inventories. There are a number of symptom inventories that are routinely collected, including several that are included as Common Data Elements (CDEs) for TBI, but without a way to convert between scales, results drawn from different settings and studies are not comparable. The ENIGMA Clinical Endpoints Working Group set out to determine how to harmonize data from different scales to enable well-powered mega-analyses of large datasets drawn from a variety of sources. The four scales included are the Neurobehavioral Symptom Inventory (NSI), Rivermead Postconcussive Symptom Questionnaire (RPQ), Brief Symptom Inventory (BSI), and the Symptom Checklist-90 (SCL-90). NSI and RPQ are CDEs for TBI, but the BSI and SCL-90 are also routinely collected. Here, we present an approach using semantic textual similarity (STS) to link symptoms and scores across previously incongruous symptom inventories by ranking item text similarities according to their conceptual likeness. We tested the ability of four pre-trained deep learning models to screen thousands of symptom description pairs for related content - a challenging task typically requiring expert panels.

Models were tasked to predict symptom severity across four different inventories for 6,607 participants drawn from 16 international data sources. The STS approach achieved 74.8% accuracy across five tasks, outperforming other models tested. The resulting analysis pipeline is available as a free online tool [https://enigma-tools.shinyapps.io/symptom-inventories-calculator/] that can convert scores across previously incompatible symptom inventories. This work suggests that incorporating contextual, semantic information can assist expert decision-making processes, yielding broad gains for the harmonization of TBI assessment.

314 Exploring Computer-Mediated Communication Use in Adolescents with Acquired Brain Injury: Preliminary Findings from a Co-Designed Survey

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ABSTRACT

Background: Computer-mediated communication (CMC), including text messaging, social media, gaming, and videoconferencing, serves as a central means of connection and self-expression among adolescents. With 95% of adolescents having access to smartphones and 45% online nearly constantly, CMC is an integral part of adolescent life. Particularly, social media plays a critical role in enabling adolescents to connect with peers, share content, and participate in online communities. Adolescents with acquired brain injury (ABI), however, often face barriers to social participation due to motor, cognitive, sensory, communication, and behavioral challenges from their injury. While CMC may provide a unique opportunity for social engagement, there is limited understanding of how cognitive, executive functioning, and communication difficulties influence CMC use in this population. This study aimed to administer a co-designed survey to explore and quantify the patterns and preferences of CMC use among adolescents with ABI. The survey was developed using a participatory design approach through collaboration with youth leaders with lived experience of ABI, the research team, family advisors, and rehabilitation professionals.

Methods: The co-design process was guided by the Double Diamond Framework and involved the creation of the Social Media Building Blocks (SMBB) survey. The SMBB survey, as well as the Child and Adolescent Scale of Participation (CASP), and the Latrobe Communication Questionnaire - Self version (LCQ-S), were administered to adolescents with ABI, aged 13 to 21 via REDCap. Purposive sampling was used to target community-dwelling youth with ABI, recruited through a children's treatment hospital.

Results: Preliminary analysis of data from seven respondents (mean age = 15.42 years; 4 females) revealed that participants began using CMC at a mean age of 9.14 years. Common causes of injury included motor vehicle accidents, strokes, and falls. Participants reported using 3-5 social networking sites, such as SnapChat, Instagram, and TikTok, primarily for entertainment and communication with known networks (e.g., face-to-face friends), with many indicating they used CMC "almost constantly." Unique challenges for adolescents with ABI included physical and sensory difficulties (e.g., headaches, hemiparesis, vision), cognitive challenges (e.g., remembering information, attending to posts), communication issues (e.g., understanding humor, following conversations), and emotional concerns (e.g., anxiety over online identity). Participants also raised concerns about privacy, security, navigating busy interfaces, and maintaining independence online. A few indicated that rehabilitation professionals could play a supportive role in addressing these challenges.

Conclusions: Initial findings suggest that adolescents with ABI are actively engaged in CMC and face unique barriers affecting their experience. The study underscores the importance of tailoring support strategies for this population, with potential for rehabilitation professionals to assist in overcoming these barriers and enhancing social participation in digital spaces. Future steps involve continued survey dissemination to achieve a larger representative sample and refine support recommendations.

315 Expanding the Horizons for TBIBank: Reflecting on Accomplishments and Creating a Roadmap for the Future

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ABSTRACT

Backgroud: TBIBank is an internationally shared database that includes a standardised spoken discourse protocol, a research database and a multimedia teaching platform. The protocol, established in 2005, has contributed the first standardised large dataset for communication disorders after traumatic brain injury (TBI). Since the protocol's development, numerous published studies using data from the standardised dataset have improved our understanding of the nature of communication disorders post-TBI and optimized spoken discourse measurement in this population. However, this research has also highlighted the need to revise the protocol to ensure that it is; underpinned by research evidence, relevant across cultures and suitable for application across TBI severities. Hence, this study's aim was to develop and obtain consensus on a new TBIBank protocol.

Methods: Three rounds of online consensus were scheduled with 22 representatives from Australia, the United States,

England and China between August 2024 and November 2024. Asynchronous feedback options were offered for those who were unable to attend the scheduled meetings. The first round focused on strengths and weaknesses of the original nine protocol items including free speech tasks, picture descriptions/sequences, narrative retelling and procedure. A post-meeting poll captured preferences for including, modifying or excluding the original items. The second round focused on generating novel ideas for additions to the protocol. A final round will obtain consensus on a finalized list of protocol items with refined wording and elicitation methods.
Results: Round 1 revealed consensus on inclusion of all the original TBIBank protocol tasks. One task reached consensus for modification, changing the word 'speech' to 'communication' to better reflect cognitive-communication disorder. Other minor wording changes were suggested. A further suggestion was to redraw stimuli for improved visual clarity. Key discussion points included integration of research evidence, potential impacts of protocol changes on datasets, sensitivity for mild cognitive impairments and cultural responsiveness. In Round 2, suggestions for new protocol items included: conversation sampling, the modern Cookie Theft picture, the Boy Who Cried Wolf retell, describing plans for a trip to New York (or another big city), and the voicemail elicitation task.
Conclusions: Two consensus rounds generated a list of items for developing a revised TBIBank 2.0 protocol that is supported by research evidence and expert consensus. In a final consensus round in November 2024, we will finalize the revised protocol, with expanded application across cultures and TBI severities.

316 A Retrospective Observational Study of Alcohol-Associated Traumatic Brain Injuries in a Major Trauma Centre

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ABSTRACT

Background: Alcohol plays a complex role in Irish society and is associated with many aspects of Irish social life and is also routinely consumed at home. The societal cost of alcohol use in Ireland is estimated at 3.7 billion euro per year with annual healthcare costs estimated at up to 1.5 billion euro. However this is thought to be an underestimation due to coding practices in Ireland. Understanding the burden of alcohol on the health is an important element in informing public health policy decisions and appropriate resourcing in healthcare. The incidence of alcohol-related traumatic brain injury and the associated healthcare costs in Ireland is not well understood. AIMS: This study describes the epidemiology of alcohol-associated traumatic brain injury admitted to a major trauma centre (MTC) in a 9 month period. We aim to quantify resources required for this patient cohort during their inpatient stay.
MethodsS: This is a retrospective study including patients who were admitted to a major trauma centre and reviewed by the inpatient trauma service (IPTS). Patients were categorised as "alcohol-associated" trauma based on self-declaration of consumption of alcohol, reference to intoxication in the initial patient assessment by emergency medicine or on prehospital documents and ethanol levels taken in the Emergency Department. Traumatic brain injury (TBI) includes all patient who had head injuries inclusive of mild concussion to severe brain injury. Length of admission, requirement for ICU, number of operative interventions, and discharge destination were used as surrogates for resources required.
Results: 644 patients were reviewed by the IPTS between 1st Jan to 30th Sept 2024. 164 of these patients had TBIs. 44 of these patients had alcohol-associated TBIs, 34 were male. Of the 44 patients, 48% (n=21) had a injury severity score greater than 15, indicating severe injury. 30% (n=13) required admission into ICU, and 20% (n=9) required neurosurgical intervention. In total 466 bed days were taken by this cohort of patients. 27% (n=12) were transferred to another acute hospital, discharged to a rehab facility, or remain in the MTC. 48% (n=21) were discharged home and 1 died due to their injury. Examining the mechanism of injury; 30% (n=13) fall < 2 metres, 23% (n=10) fall >2 metres, 25% (n=11) assault, 14% (n=6) road trauma, and 9% other.
Conclusions: Patients who were admitted to CUH with head injuries sustained in the context of alcohol present require the input of significant resources and hospital bed days. The most common mechanism of injury was falls. During admission in the MTC, patients require input from multiple medical/surgical specialities and allied healthcare professionals. 27% of these patients required discharge to a lower level acute hospital or rehabilitation facility, indicating ongoing cost to the public healthcare system.

318 'Violence isn't Simple": Service Provider Insights on Violence After an Acquired Brain Injury

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ABSTRACT

Displays of violence can be a common occurrence following an Acquired Brain Injury (ABI) and can lead to psychological, social, and physical harm for those who experience it. Survivors of ABI who engage in violence can face legal repercussions, social isolation, and may become involved in a cycle of violence. Prevention and reduction of violence requires an understanding of contributing factors, but research findings remain mixed for persons with ABI. Health and wellbeing service providers have a unique perspective as their roles require awareness and understanding of outcomes for individuals with ABI, including violence. Additionally, service providers often face violence directed at themselves from clients

and have first-hand experience with contributing factors. Such perspectives can provide insight into how to prevent this behaviour and mitigate harm. The aim of the current study was to explore the relationship between ABI and violence from the perspective of service providers in Victoria, Australia. Individual semi-structured interviews were conducted over the online platform Zoom, with eight (25% female, 75% male) participants from social (4), physical (2), and mental health (2) services. Interviews, on average, were 40 minutes long. Coding and thematic analysis followed an iterative approach. Findings demonstrated that belief in the association between ABI and violence varied, but most participants endorsed a moderate to strong association. Contradictions emerged from participants who believed there was weak association between ABI and violence, who noted that ABI could lead to violence if comorbidities, such as substance use, were present, indicating they did not consider the exacerbating influence of ABI on other predictors of violence. Participants identified additional key factors that may increase the likelihood of violence after an ABI, including changes in cognitive function, impaired social communication, and mental illness. Increased violence was suggested to be influenced by lack of social support, homelessness, and barriers accessing formal support due to financial constraints and complex service systems. It was noted that individuals with ABI experience more difficulty participating in interventions, and experience worse outcomes, than service users without ABI. Overall, participants identified a lack of staff-training to make changes to service delivery that accounted for the unique needs of persons with ABI. This could contribute to poor service outcomes and unmanaged comorbidities that may increase the likelihood of violence. To prevent or reduce violent behaviour, exacerbating factors, such as mental illness and substance use must be addressed. Notably, there is a broad range of potential factors, such as cognitive and social changes, that are beyond the scope of what an individual service can feasibly address. Improved brokerage between different services may resolve this issue by concurrently addressing various areas of concern. Further training and service adjustments are also needed to ensure survivors of ABI receive suitable care.

319 Evaluating a new Chronic Pain Management Program and Resources for Traumatic Brain Injury using a Series of Single Case Experimental Designs.

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ABSTRACT

Chronic pain is a recognised consequence of moderate-to-severe traumatic brain injury (TBI), which can significantly impact rehabilitation, social participation, activities of daily living and meaningful engagement with family, peers, education, and employment. The prevalence rate is estimated between 30-50% of the TBI population, which represents a higher prevalence rate than the general community (~20%). Overall, the literature suggests the use of a biopsychosocial approach, however, there is very limited evidence to direct clinicians to select the most appropriate pain management strategies for use in this population. In response to this identified clinical gap, the Be Pain Smart – Treatment Program (BPS-TP) was developed as an interdisciplinary, patient-centred approach to pain management. The BPS-TP includes a six step online interactive clinical reasoning tool to assist clinicians to develop a personalised pain management plan for individuals with a TBI. Clinicians implement the plan using evidence-based, non-pharmacological pain management strategies specifically designed for people with cognitive impairments. The strategies are accessible on the Chronic Pain and Brain Injury Website (https://aci.health.nsw.gov.au/chronic-pain/brain-injury), which is a resource platform for people with a TBI, to use simple tools to learn to manage pain. The resources include 13 educational videos on chronic pain management topics that can be viewed by consumers and/or carers including personal stories of people with TBI managing chronic pain. The 37 strategies and 88 downloadable, printable and editable pdfs map to the seven main domains (physical function, ability to participate in social roles and activities, anxiety, depression, fatigue, sleep disturbance and pain

interference) of the Patient Reported Outcome Measurement Information System – 29 (PROMIS-29+) allowing for an integrated assessment and treatment approach. The clinical effectiveness of the BPS-TP is being evaluated using a series of Single Case Experimental Designs (SCEDs). Emerging data from selected case studies in this SCED series will be presented to highlight how to use the BPS-TP and website resources to develop and implement an individually tailored pain management plan for individuals with a TBI. Pre and post scores on the PROMIS-29+ and the Brief Pain Inventory (BPI) demonstrated clinically meaningful changes in pain interference. Consequently, these preliminary results provide promising evidence for the effectiveness of the BPS-TP in reducing the level of pain interference in the lives of TBI participants which lead to additional improvements in other domains, emphasising the critical role of an interdisciplinary, patient-centred approach to pain management in this highly complex cohort.

320 The Experiences of Survivors of Intimate Partner Violence Who Have Been Attended to By Paramedics: Service Gaps and Solutions with Implications for Intimate Partner Violence-Caused Traumatic Brain Injury

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ABSTRACT

Introduction: Complex biopsycho-ecological concerns are increasingly being attended to by paramedics. Intimate partner violence (IPV) is an ongoing and persistent public health pandemic with damaging health sequela. This complex clinical circumstance frequently co-occurs with IPV-caused traumatic brain injury (IPV-TBI) in the majority of survivors of physical IPV, harmfully extending health detriments. It is unknown if the current services provided by paramedics and paramedic service organizations meet the ranging and versatile needs of survivors of IPV and if they account for IPV-TBI.

Objectives: Explore the experiences of survivors of IPV who have been attended to by paramedics.

Methods: Semi-structured qualitative video interviews with self-identified women who experienced IPV and were attended to by paramedics in western Canada were designed, conducted, and analyzed using an interpretive description approach for applied disciplines. Interviews discussed the survivors' experiences with IPV, services received from paramedics, barriers and facilitators to receiving services, and desired services and practices. Verbatim transcripts were de-identified, categorized, reviewed, and mobilized into relevant challenges and corresponding survivor-derived solutions to service delivery deficits (NVivo).

Results: Nine survivors of IPV (Race - White 6/9 (67%), Asian 1/9 (11%), Black 1/9 (11%), Not Listed 1/9 (11%); Age 37±10 years) participated in interviews. Survivors reported that they encountered paramedics after experiencing IPV (overall IPV history (multiselect): physical 9/9 (100%), emotional 8/9 (89%), sexual 7/9 (78%), stalking 5/9 (56%), not listed 3/9 (33%)). All survivors reported signs and symptoms consistent with enduring an IPV-TBI following bouts of physical IPV, commonly at repeated timepoints and including bouts of non-fatal strangulation. Common challenges survivors faced when being attended to by paramedics included 1) a lack of trauma-informed and IPV-aware care by paramedics, 2) insufficient service pathways available to survivors, 3) disadvantageous social determinants of health impacting care, 4) insufficient infrastructure to address complex cases and multidisciplinary challenges, including consideration for co-presentation with trauma responses, IPV-TBI, mental health conditions, and/or substance use. Corresponding solutions for paramedics and paramedic service organizations included 1) having paramedics recognize IPV and provide an appropriate trauma-informed response supported by mandatory education and training, 2) having paramedic service organizations develop, sustain, and continuously improve divergent service pathways for survivors during conveyance and non-conveyance, 3) prioritize health equity efforts specifically targeting related social determinants of health, and 4) develop collaborative interagency infrastructure to support continued multimodal and holistic service access for survivors.

Conclusions: These survivor-identified challenges and corresponding solutions begin to provide guidance to overcome key service delivery deficits for those accessing services through paramedics. Adequate paramedic service delivery requires advancements to develop functional pathways across a spectrum of patient needs. Formal implementation science is warranted to develop parallel education, training, and infrastructure to positively effect paramedic service access for survivors of IPV.

321 Evaluation Of the Be Pain Smart – Online Clinician Pain Management Education Modules

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ABSTRACT

There is a growing body of literature aimed at understanding the assessment and management of chronic pain after moderate to severe traumatic brain injury (TBI). Interdisciplinary pain management is accepted as gold standard for chronic pain, but there is limited evidence to guide clinicians on how to modify general pain management strategies for people with a TBI. The Be Pain Smart – Online Education Modules (BPS-OEM) are a suite of online modules, providing evidence-based training for clinicians on pain management strategies for people with a TBI. The modules have utilised optimal adult learning principles within the design to support the learning of pain management strategies and clinical decision making aligned

with the Be Pain Smart – Treatment Program (BPS-TP). The online delivery allows for maximum accessibility to facilitate the training of clinicians across metropolitan and rural/remote regions. The BPS-OEM provides training and a clinical reasoning framework to assist clinicians to improve access to and the delivery of appropriate pain management services for people with a TBI. To evaluate the feasibility and acceptability of the BPS-OEM, particularly examining clinicians' pain beliefs, confidence and clinical practice when managing pain with people who have a TBI. The added value of additional 6 group mentoring sessions to compliment the BPS-OEM will be reviewed. A sample of allied health clinicians were recruited via advertisements through the relevant New South Wales (NSW) networks. Data was collected via an online survey with outcome measures targeting clinical practice, knowledge, confidence, pain beliefs and clinical value of the BPS-OEM. Significant improvements were found in clinician confidence and pain knowledge, and in addition, clinicians' pain beliefs were changed to align with interdisciplinary pain management approaches. The high enrolment numbers to modules and attendance to the webinars indicates that the program is feasible and accepted amongst health care professionals. In conclusion, chronic pain management following TBI is currently limited due to a lack of guidelines, knowledge, skills and confidence of clinicians. Education of clinicians about chronic pain management is a foundational step in implementing effective chronic pain management for TBI. The BPS-OEM was found to be a feasible and acceptable training method for clinicians which showed improvement in clinician knowledge, skills and confidence in chronic pain management concepts and strategies. Further research is needed to assess the effectiveness, barriers and facilitators in implementation of chronic pain management for the TBI population.

322 COCO (COncussion COmmunication) Knowledge Mobilisation Program: A Collaborative Approach to develop a Detection Tool

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ABSTRACT

Introduction: Pediatric concussion is common in early childhood (i.e. 0–5 years). However, most knowledge mobilization (KM) initiatives and studies primarily focus on children aged 6 years and older, especially within school settings, leaving a gap in tailored KM tools for younger children (Mallory et al., 2022; McKinlay & Buck, 2019). In this population, unique challenges exist due to the difficulties in self-reporting symptoms and the distinct symptom patterns associated with early childhood concussions (Dupont et al., 2022; 2023). Most children in this age group also spend a significant amount of time in formal childcare settings, necessitating appropriate tools for use by childcare educators.

Objective: This study is part of the COCO (COncussion COmmunication) KM Program, and aims to address the gap in early childhood concussion KM through two objectives: (1) explore childcare educators' knowledge of early childhood concussion, and (2) develop a concussion detection tool specifically designed to meet their needs.

Methods: (1) The first phase of the study involved a survey administered to 28 educators in Quebec's largest daycare center, assessing their experiences with head injuries, training and knowledge of concussions, and preferred methods for receiving information. (2) The second phase involved the development of a concussion detection tool through a collaborative, iterative approach, drawing on input from the survey, focus groups, pediatric emergency and traumatology health care professionals, literature, existing guidelines, and in-person training sessions. A total of 23 educators and 36 students in a childcare education program participated in these sessions, with post-training surveys completed by seven educators and all 36 students.

Reults: The resulting COCO Detection tool is a one-page decision aid designed to guide educators through the steps to take after witnessing a head injury in a young child. It includes a list of signs and symptoms, with corresponding levels of urgency and recommended actions. Out of the 43 individuals who completed post-training surveys, most (n=40, 93%) thought that they could use the COCO Detection tool in their future practice. All respondents (n=43, 100%) found the tool very or rather easy to use, and all students (n=37) considered it very or rather relevant.

Conclusions: Childcare educators frequently encounter head injuries but may not fully understand their potential impact or recognize them as concussions. The COCO Detection tool is a promising solution to empower educators to better identify and respond to possible concussions in young children. Future research should investigate factors that may enhance educators' confidence in using the tool, as well as the potential for broader applications beyond childcare educators, such as its adaptation for other early childhood professionals including day camp counsellors and healthcare professionals.

323 A Scoping Review of Visual Elicitation Materials Used For Narrative Discourse After Traumatic Brain Injury

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ABSTRACT

Background: Cognitive communication disorder commonly occurs after traumatic brain injury (TBI) and may be most evident in spoken discourse. Management of discourse is a critical component of speech-language pathology (SLP) practice, and SLPs elicit narrative samples as part of clinical

practice post-TBI (Hoffman et al., 2024; Steel et al., 2024. Research literature has reported extensively on use of narrative discourse to characterize changes post-TBI, using a range of visual elicitation stimuli. However, the form of visual stimuli can influence the person's cognitive and emotional response and engagement. The purpose of this study was to identify and review visual stimulus materials used in narrative discourse tasks for cognitive communication disorders after TBI. A scoping review was used to collate the visual materials used in empirical research for spoken narrative elicitation post-TBI. We aimed to examine the format, structure, and sources of visuals used. Discourse analyses were also investigated.

Methods: The review followed PRISMA extension guidelines for scoping reviews. Searches were conducted between 26th September 2023 and 1st March 2024, in four electronic databases. We sought peer-reviewed original research studies reporting spoken narrative tasks using visual elicitation stimuli after TBI. Secondary searches were also undertaken.

Results: There were 1461 studies identified in the search, of which 60 studies were eligible for data extraction. There were 11 common visual elicitation stimuli used across 51 studies. Stimuli used to elicit narratives ranged from single pictures to a 26-page storybook. The Flowerpot Incident, a 6-image black and white picture sequence, was used in more studies than any other image, but overall the most common format was wordless picture book. These materials originated from four sources: 1) tasks designed for people with aphasia; 2) adapted children's storybooks, some with original text removed; 3) visual materials from a second language learning resource book; and 4) tasks designed for purpose for people with TBI. The study identified that macrostructural analyses were reported in use in most studies, however there were variations in terminology for analysis constructs across studies. One of the key shortcomings identified from this review was the limited discussion around content acceptability and cultural relevance of narrative stimulus materials to the people who use them.

Conclusions: Research studies are using picture sequences or wordless storybooks to elicit discourse samples after TBI. This contrasts with a recent survey of clinical practice with discourse post-TBI, where a single image, The Cookie Theft, was most reported in use (Steel et al., 2024). Few studies reporting on narratives used stimulus materials designed for purpose for people with cognitive communication disorder after TBI. We discuss the relevance of findings in relation to INCOG guidelines (Togher et al., 2023) and SLP practice, and make recommendations for clinical and research future directions.

324 Exploring the Views and Preferences of People with Traumatic Brain Injury on the Visuals Used in Narrative Discourse Elicitation Tasks

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ABSTRACT

Background: Traumatic brain injuries (TBI) often have a long-term impact on an individual's cognitive communication ability, affecting social interactions and relationships. This can be most evident in spoken discourse. Discourse assessments are recognised as critical to evaluate both the monologic and conversational levels of communication. Stakeholder perspectives on clinical materials have been explored in a range of areas of speech-language pathology (SLP) practice (e.g., post-stroke aphasia) and are key to the future development of SLP assessment and intervention resources; however, the views of people with TBI on currently used elicitation materials have not been examined. This research aimed to understand stakeholder perspectives on various narrative discourse stimuli, with the aim of informing and supporting clinical practice for communication post-TBI.

Methods: A mixed-method approach was utilised in this pilot study, with face-to-face semi-structured interviews, and rating and ranking scales. Participants were asked to complete eight narrative discourse elicitation tasks. Stimuli included single pictures (e.g. the Cookie Theft), picture sequences, a wordless picture book (Cinderella story), and a short video. This was followed by an interview seeking their views and preferences around these tasks. Questions explored participants' engagement, interest and preferences of the visual tools used in the assessment. A thematic framework approach was taken for the analysis of data. Participants ranked the tasks in order of preference and used a rating scale to rate each individual task.

Results: Two participants with cognitive communication disorder after severe TBI discussed their views on individual tasks, and ranked these, providing an understanding of their preferences. Participants rated picture sequences, a wordless picture book and video formats highly, noting that the progression over time and the format of both the video and the longer story supported the narrative elicitation. Participants also identified that this led to more engagement in the task. Key areas discussed included ease of understanding; format of the presented visual; and engagement. Distinctions were made between video, single and multiple image sequences; black and white or colour images; and the impact this had on both understanding and story generation.

Conclusions: Narrative discourse elicitation tasks are a beneficial way to assess and analyse discourse in individuals post TBI, fulfilling a key area within the assessment battery. Stakeholder perspectives provided an understanding of the level of engagement and interest in the tools used during these assessments. Participants identified video format and picture sequences as being most engaging. They also discussed their views on content preference, ease of understanding and interests. Findings from this preliminary research add to limited evidence on the types of visuals that are most engaging and why. Future research is needed to explore the impact of engagement on discourse production measures and further development of visual stimuli for discourse elicitation.

325 Communication Outcomes following Stroke in the Ho Municipality of Ghana: Preliminary Findings

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ABSTRACT

Stroke research in Ghana often focuses on risk factors relating to lifestyle-related diseases, including diabetes and high blood pressure. Among the few studies conducted on the rehabilitation of Ghanaian stroke survivors, the focus has been on physiotherapy. Like this Ghanaian empirical stroke literature, clinical services for stroke patients often excludes rehabilitation for communication disorders (speech, language and hearing), despite these being prominent among stroke survivors. This study aimed to explore communication disorders as outcomes of stroke, so as to use available evidence to contribute to the development of better protocols for stroke care. More specifically, stroke patients are (a) screened once for hearing disorders using pure tone audiometry and (b) screened trice (with three-months interval) for language disorders (aphasia, which affects 30% of stroke survivors) using an ecologically adapted (culturally and linguistically) tool. This fundamental study aimed at generating descriptive data on post-stroke communication disorders, addresses the lack of data and tests for aphasia despite the country's growing stroke population, and yields information regarding characteristics of Ghanaian stroke survivors via a tailored screening protocol, which would be validated in subsequent studies. Also pertinent is the advocacy for routine audiological assessments as part of regular care for stroke patients.

326 Exploring the Lived Experiences of Family Caregivers of Stroke Patients in a Resource Constraint Setting: Preliminary Findings

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ABSTRACT

Family caregivers play an important role in the recovery and rehabilitation of stroke patients. Despite the substantial benefits their support provides to the patient, a lack of an integrated system to support holistic health delivery for stroke care puts an enormous burden on family caregivers as they navigate life with additional responsibilities imposed on them. Inadequate health infrastructure places patients and their caregivers in more desperate or helpless circumstances. Investigating the lived experiences of family caregivers of stroke patients via a qualitative study (phenomenological study design) presents one way of directly uncovering the progression and impacts of stroke on both patients and the family members who care for them. In addition to their experiences in general, this study focuses on family caregivers' experiences with regards to post-stroke communication difficulties experienced by their family member. The study provides insights into care challenges and the support needed by family caregivers to advocate for adequate and sustainable support to them in the future.

327 Learning Without Trying in Aphasia: Language and Cognitive Profiles of Implicit-Statistical Learners

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ABSTRACT

Learning is central to success in rehabilitation following brain injury, but how the damaged brain learns, or relearns, is not well-understood. Most learning in rehabilitation relies on explicit instruction. However, implicit-statistical learning (ISL) is the type of learning that occurs during the acquisition of higher-cognitive skills, like language. ISL is a type of learning that occurs outside immediate awareness and is a prerequisite for language acquisition. Thus, it may be expected that ISL is also relevant to language relearning as it occurs in rehabilitative efforts. To investigate the status of ISL post brain injury, auditory and visual non-native or artificial grammar tasks were administered to nine individuals with post-stroke aphasia (PSA) and ten age- and gender-matched healthy adults. Language and severity of aphasia was characterized in the PSA participants. ISL and cognitive assessments were completed for all participants. The ISL tasks employed aXb grammars where the statistical relationship between a and b relied on X. Training phases included Norwegian sentences for the auditory task and symbol strings for the visual task. Evidence of ISL was defined as above chance accuracy calculated with d' in a forced choice paradigm in a test phase. Aphasia severity for the PSA participants ranged from moderately severe to very mild (Western Aphasia Battery-Revised

Aphasia Quotient [AQ] 34.7 – 99.1) with classifications of 4 Latent, 2 Anomic, 1 Broca, 1 Transcortical Motor, and 1 Conduction. The PSA individuals performed similarly to the healthy controls for nonverbal intelligence, sustaining focused attention, and episodic memory, but poorer for cognitive flexibility/switching (t(14) = -3.375, p = 0.002) and verbal short term memory (t(17) = -2.751, p = 0.007). Six of the PSA and 8 of the controls performed above chance on the auditory ISL and 7 PSA and 10 controls were above chance for the visual ISL task. There was no significant group difference for input modality (auditory: U = 44.5, p = 0.97; visual: U = 34.5, p = 0.63). Auditory ISL correlated moderately with verbal short-term memory for delayed (5-second) nonword repetition (rho(19) = 0.47, p = 0.04), but no significant correlations existed with visual ISL. Aphasia severity was not correlated with ISL. Of the 4 participants with PSA performing below chance, one did so on both ISL tasks (latent aphasia, age 83, AQ = 94.2), two on the auditory ISL (anomic, age 64, AQ = 85.4; Broca, age 63, AQ = 34.7), and one on the visual ISL task (anomic, age 69, AQ = 90.7). These preliminary data suggest that individuals with PSA learn through ISL means in both auditory and visual modalities but have more difficulty with auditory ISL when verbal short-term memory is limited, as was also the case in the healthy comparison group.

328 Co-design Of An Intergenerational Initiative To Support Social Participation Of People Aging With Traumatic Brain Injury

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ABSTRACT

Introduction: Advancements in medical, social and rehabilitation practices have significantly improved the life expectancy of individuals living with traumatic brain injury (TBI). The importance of social participation, viewed as involvement in life situations providing interactions and shared experiences with others at the societal level, has been increasingly recognized in maintaining the health of individuals aging with TBI. However, older adults with TBI often face challenges in social participation due to agism and disability-related stigma. Interventions specifically designed to support social participation for this population are limited and rarely studied. Community organizations providing services to individuals with TBI have identified a need to create activities that maintain and improve social participation for their aging members. Intergenerational activities can positively affect the physical, cognitive, and psychological health of older adults and enhance their social participation. Thus, developing and implementing intergenerational initiatives is a promising avenue to support social participation of individuals aging with TBI.
Objectives: To co-design an intergenerational initiative centered on the creation of life stories for individuals aging with TBI, presented through photographs.
Methods: A participatory study was conducted using Design Thinking to guide the co-design process of the intergenerational initiative. Six co-design workshops, each lasting an average of two hours, were conducted. These workshops involved four individuals from two different generations – both young (18 – 35 years old) and older (55 years old and more) – living with TBI in Quebec (Canada), as well as four community workers and a manager from a non-profit community organization which supports social participation in this population, and experts in photography and medical narrative. The co-design activities included brainstorming sessions, group discussions, individual interviews, art creation (e.g., photography and illustrations), and prototyping.
Results: The resulting intergenerational prototype for people with TBI comprised seven sessions, which culminated in a public photo exhibition. A participant workbook, a tool for pairing intergenerational TBI-affected individuals, and strategies for promoting the initiative were also co-developed. Recommendations were made regarding the development process of intergenerational initiative for individuals with TBI, such as considerations for language sensibility and complexity and adaptation to their short-term memory impairments.
Conclusions: The co-design process allowed the involvement of key knowledge users in co-developing an innovative intergenerational initiative, which will be implemented and evaluated in the fall of 2024. This program will offer valuable opportunities for social participation, supporting the health of individuals aging with TBI, while fostering intergenerational solidarity and bridging the gap between generations. The public photo exhibition will also help reduce the stigma associated with TBI.

329 Prognoses, Outcomes, and Sequelae in Disorders of Consciousness (DOC): Cardiac versus Non-cardiac Hypoxic Ischemic Brain Injury (HIBI) and Traumatic Brain Injury (TBI)

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ABSTRACT

Background: The objective of our research study was to investigate outcomes of Disorders of Consciousness (DOC) patients with hypoxic-ischemic brain injuries (HIBIs) compared to

those with traumatic brain injuries (TBIs). More robust literature exists with the moderate to severe traumatic brain injury (TBI) population, likely in part due to the TBI Model System database. However, the literature on those with DOC secondary to HIBI (DOC/HIBI) is sparse. Very little is known regarding the outcomes of individuals with HIBIs, and even less research is available comparing outcomes by etiology.
Methods: This was a retrospective chart review consisting of three inpatient rehabilitation hospitals (IRHs) in the Northeastern United States. A pre-existing DOC patient database was queried for demographics, etiology of brain injury, medical comorbidities, outcome measures, and neurological sequelae. A total of 98 patients were included for analysis including DOC/HIBI n=46, and DOC/TBI n=52.
Results: Overall demographic analysis revealed individuals with DOC/HIBI (n=46) compared with DOC/TBI (n=52) were older with a mean age of 42.9 years vs 36.9 years (p=0.037), had lower admission coma recovery scale-revised (CRS-R) scores (p=0.018), and were more likely to be in an unresponsive wakefulness state (UWS) on admission 80.4% when compared with DOC/TBI 57.5% (p=0.016). The DOC/HIBI group was 3.4 times more likely to be discharged in an UWS compared to TBI counterparts at 62.5% versus 35.3%, respectively (p=0.004). Additionally, HIBI/DOC were more likely to have myoclonus (p=0.001) and cortical blindness (p=0.020). There were no statistically significant differences between DOC/HIBI compared to TBI regarding spasticity (p=0.602), dysautonomia (p=0.294), or seizures (p=0.617).
Within the HIBI group, etiology was categorized by cardiac DOC/HIBI n=16 and non-cardiac DOC/HIBI n=30. Non-cardiac etiologies were composed of the following categories: substance/overdose (n=11), perioperative arrest (n=11), respiratory (n=6), and other (n=2). Patients with cardiac DOC/HIBI were significantly older at 53.1 years old versus 37.4 years (p<0.001). Regarding discharge outcomes, patients with DOC/HIBI secondary to cardiac outcomes were more likely to be discharged to an acute care hospital from IRH (p=0.017). Individuals with DOC/HIBI of a cardiac nature were more likely to be discharged to acute care but had no differences in the level of DOC or neurological sequelae, including myoclonus (p=0.757), cortical blindness (p=1.000), spasticity (p=0.216), dysautonomia (p=0.754), or seizures (p=0.283).
Conclusion: In conclusion, our research suggests individuals with DOC from HIBI origin were more likely to be discharged from IRH in UWS. Moreover, DOC/HIBI patients were more likely to experience myoclonus and cortical blindness compared to DOC/TBI counterparts. Regarding those with DOC/HIBI, cardiac etiologies were more likely to be discharged to acute care, but there were no differences in the level of DOC or neurological sequelae.

330 The Effectiveness of the Spokane mTBI Exam (SME) for Identifying Neurological Soft Signs in High School Aged Females Who Have Experienced Low Velocity/Sport-Related Concussions (SRCs)

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ABSTRACT

Most mild traumatic brain injuries (mTBIs) are diagnosed based on patient history and/or subjective impressions, rather than objective clinical signs. Consequently, diagnostic accuracy for mTBI in emergency settings is often inadequate. Furthermore, physical examination measures for mTBI are not uniformly utilized, nor have they been accurately formulated based on objective studies. Current sports concussion exams are largely founded on either expert consensus (e.g., SCAT6) or the examiner's discretion.
An mTBI results in subtle damage to a diffuse network of neuronal connections involving the cortex, brainstem, cervical cord, and/or autonomic nervous system. This leads to abnormalities that cannot typically be localized to a specific lesion. Therefore, soft sign exams maybe a better way to assess these patients. The Physical and Neurological Examination of Soft Signs (PANESS), originally designed to detect developmental difficulties, has shown promise in detecting residual deficits in SRCs, relative to some of the current mTBI assessment exams. However, the PANESS was not originally designed for acquired traumatic pathology, such as SRCs.
In previous research, we demonstrated that the SME, a soft sign exam originally developed for high velocity mTBIs, revealed individuals with a mTBI displayed significantly more soft signs than healthy controls. This work also revealed that subconcussed athletes, in contact sports, generally displayed an increase in soft signs, on at least a temporary basis, following sport participation. In this study, we used the SME to determine the average number of soft signs in a healthy, never concussed, athletic female population and compared their results to those from their peers who had previously been concussed but had 'recovered'.
The SME includes several visual, motor, balance, autonomic, and reflex tests that can be conducted at the bedside or sideline. To date, we have studied over 30 individuals. The average number of soft signs observed in the healthy population was 1.6, with a range of 0-3 and a standard deviation of 0.8. Individuals scoring above 3 soft signs were more than two

standard deviations beyond the mean. In our mTBI population, the average soft sign score was 5.8, with a range of 3-10. Notably, the single concussed athlete who scored a 3 experienced only a single concussion more than two years prior to testing.
The SME shows promise as a standardized tool for assessing all mTBI patients, both SRC and high velocity injuries. The SME has the potential to improve diagnostic accuracy and guide treatment interventions. Furthermore, our preliminary data and past research suggest that the number of soft signs present in an individual is directly correlated with the number of concussions experienced and/or the forces involved in with their injury. Additionally, our sequential testing data, suggests that the rate of soft sign resolution may help predict outcomes.

331 Personalized Cognitive Rehabilitation: Preliminary Results of a Proof-of-Concept Study

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ABSTRACT

Background: Cognitive deficits are common following moderate-severe traumatic brain injury (TBI). Addressing these deficits is critical for promoting patients' return to valued life roles. Fortunately, at the group level, a number of cognitive rehabilitation interventions have proven efficacy. Yet, these group-level results obscure the fact that for many interventions, a significant proportion of patients are non-responders. This variability in treatment response underscores the need for personalized approaches to rehabilitation. Critically, the vast majority of interventions for cognitive impairments are behavioral: patients work with a therapist to learn or re-learn some set of knowledge or skills. Therefore, the primary treatment mechanism in cognitive rehabilitation relies heavily on learning and memory. Furthermore, there are multiple human memory systems (e.g. declarative, procedural) supported by distinct neural networks, and individual patients with TBI can differ in their degree of impairment across each system. Similarly, behavioral interventions can differ in the degree to which they rely on declarative versus procedural memory. The current study evaluates the proposal that the memory demands of an intervention approach are a key factor in whether a given intervention "works" for a particular patient. Here, we present preliminary data from an ongoing proof-of-concept study.
Methods: Patients with a history of moderate-severe TBI complete two research visits. During the first visit, a battery of measures assess participants' declarative and procedural memory, including clinical measures (e.g. Wechsler Memory Scale; Rey Auditory Verbal Learning Test) and experimental measures drawn from the cognitive neuroscience literature (e.g. spatial reconstruction; mirror-reversed reading; rotor pursuit). During the second visit, participants complete two different interventions targeting learning of face-name associations. Importantly, the two approaches differ in the degree of their hypothesized reliance on declarative versus procedural memory. The Visualization condition emphasizes the use of visual imagery strategies to support deep encoding via the declarative memory system, while the Errorless condition emphasizes principles of errorless learning to support acquisition of face-name associations via the procedural memory system. Following training, participants complete tests to evaluate how accurately they have learned the trained face-name associations in each condition. Long-term retention of face-name associations is assessed one week later. In this presentation, we will report preliminary results assessing whether patient memory profiles as measured in the first visit are predictive of differential performance across the two intervention conditions.
Results: To date, nine participants with moderate-severe TBI have been enrolled. Study procedures are feasible and data analysis is ongoing. Preliminary results from at least twenty participants will be presented at the conference. The current study provides an important first step in understanding how a patient's memory profile impacts their response to behavioral interventions that vary in memory demands, with the long-term goal of improving rehabilitative outcomes for individuals with TBI.

332 Effects on Quiet Stance Postural Control Stability in Women Who Have a History of Brain Injury from Intimate Partner Violence: A Preliminary Study

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ABSTRACT

Background: Intimate partner violence (IPV) is a pattern of physical violence, sexual violence, stalking, and/or psychological harm with coercive control. These violent events often include injuries to the head, face, and neck and therefore can also result in brain injury (BI). Despite the high incidence of IPV-BI, there has been relatively little quantitative analysis on the associations between IPV-BI and its resulting pathophysiological and psychopathological sequelae including changes to balance and postural control. From a biomechanical perspective, maintenance of upright posture during quiet-stance relies on the whole-body centre-of-mass (COM) falling within the limits of the base of support. To accomplish this, adjustments in the underfoot centre-of-pressure (COP) are used to guide the COM towards equilibrium. Larger and/or faster movements of the COP represent a worsening of postural control. The purpose of this study was to characterize different aspects of postural stability to determine the effect of IPV-BI on quiet stance postural control. It was hypothesized that quiet stance postural control would be impaired with worsening severity of IPV-BI.

Methods: The participants in this study were recruited from local community partner sites if they had at least one reported incidence of IPV (n = 40). IPV-BI was assessed using the Brain Injury Severity Assessment (BISA) tool, a semi-structured interview used to characterize BI exposure resulting from impacts targeting the head, face, and neck, and non-fatal strangulation that resulted in alterations of consciousness during episodes of IPV. During testing, participants completed one 60-second quiet stance trial for each of two conditions (eyes-open and eyes-closed). Force plate data was sampled at 1000 hz and filtered with a dual-pass, 4th-order, low pass digital Butterworth filter using a 10 hz cut-off frequency. Ground reaction forces and moments were recorded by the force plate in the X (mediolateral; ML) and Y (anteroposterior; AP) directions relative to the center of the plate. COP profiles were used to calculate measures of postural steadiness (amplitude, variability, and velocity) as well as total COP area.
Results: Results of a two-way repeated measures ANOVA showed significant main effect of BISA Score on COP area ($p = 0.031$), ML-Amp ($p = 0.012$), and ML-Var ($p = 0.015$).
Discussion: This study provides one of the first examinations of balance control in women who have experienced IPV-BI. Total COP area, ML-Amplitude, and ML-Variability worsened with more exposure to IPV-BI. These results align with results of other studies reporting that individuals with acute concussion and collegiate athletes with a history of concussion present with persistent, chronic balance impairments. These results underscore the complexity of the relationship between IPV-BI and postural control, highlighting the need for further research to elucidate the underlying mechanisms and potential factors influencing postural stability in this population.

333 Repetitive Transcranial Magnetic Stimulation (rTMS) to Improve Motor Function of Children with Brain Injury – A Randomized Controlled Trial

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ABSTRACT

Objective: This study aims to evaluate the effectiveness of combining repetitive transcranial magnetic stimulation (rTMS) with biomechanical-facilitated motor learning exercises to improve the motor function of children with brain injury.
Methods: This is a double-blind, sham-controlled randomized controlled trial. 10 children with a history of brain injury were randomized to receive 10 days of either sham or active rTMS followed by biomechanical-facilitated motor learning exercises. The primary outcome was assessed using the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2) on the last day (D10) of the intervention. ANOVA test was applied for data analysis.
Results: 6 subjects were randomized to the intervention group (median age 12.6 years) and 4 were randomized to the control group (median age 13.4 years). At D10, The increase in total motor composite was significantly higher in the treatment group compared to the control group ($P=0.031$). Significant differences between intervention and control group in total motor proficiency ($F=24.666$, $P=0.001$), specifically in balance ($F=7.080$, $P=0.029$), running speed and agility ($F=12.925$, $P=0.007$), upper limb coordination ($F=12.925$, $P=0.007$) and strength domains were observed ($F=25.504$, $p<0.001$).
Conclusions: The combination of rTMS and motor learning exercises significantly improved the motor performance of children with brain injury, compared to motor learning exercises alone.

336 Using Participatory Design and Disability Simulation Ethical Best Practices to Co-Create a TBI Empathy Training: Successes and Lessons Learned

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ABSTRACT

Background: Patients and families living with TBI frequently report that their medical and educational providers lack empathy and understanding. Experiential learning is a model of empathy training that can include disability simulation, giving a glimpse of "walking in another's shoes". While simulations can be impactful, challenges creating ethical disability point-of-view simulations exist, particularly for stigmatized conditions like TBI.
Purpose: To co-create a TBI point-of-view simulation using best practices to facilitate changes in empathy.
Method: A literature review assessing published brain-injured simulations and best practice recommendations for ethical disability simulation was overlaid with suggestions for effective healthcare empathy training. Participatory team members with lived experience had mixed severities of TBI including 2 authors who participated for the duration, 7 undergraduate and graduate students, and 3 partners/family members. All provided feedback after engaging in simulation beta-testing that was incorporated into the intervention.
Intervention: The half-day TBI empathy training was created with the following recommended principles: 1) including individuals with TBI lived experience in simulation construction and delivery; 2) amplifying the patient's voice; 3) having explicit objectives; 4) considering disability at individual and systems levels; 5) implementing a debrief; and 6) supporting

a positive attitude toward living with disability. In addition, participation was voluntary and learning was facilitated through reflective writings. The empathy training included four station activities (e.g., tinnitus, double vision, injured college student) and listening to an individual living with TBI. The initial training was completed with 20 speech-language pathology graduate students, with 19 participating in research (95%). Post-intervention, students had statistically significant increases in TBI knowledge (large effects), the importance of advocacy and interprofessional collaboration (large effects) and empathy (moderate effects).
Qualitative Results: Beta-test participants with TBI lived experiences described their surprise at the simulation authenticity, such as visceral feelings of dizziness and nausea, or cognitive feelings of cloudiness and overwhelm. They appreciated that those engaging in training would have increased TBI insights and recommended expansions for family members. Some were concerned that participants might not appreciate how symptoms have intertwined cumulative effects. This feedback was then built into training materials. Published outcomes included a communication-friendly summary for those living with TBI and the TBI Empathy Bridge conceptual model. This model, drawing from data and lived experiences, created a bridge for providers to connect more effectively with their patients and families. The primary challenge to co-creation was the significant increase in time required for meetings to ensure full understanding of study design, data analysis, and publication. The study team deemed co-creation exceptionally valuable and felt different study outcomes would have occurred without inclusion.
Conclusion: Point-of-view disability simulation can be successfully and meaningfully co-created as an approach to empathy training. Continued expansion for TBI co-design and participatory research is recommended.

338 Factors Influencing Facilitators and Barriers to Human Flourishing in the Traumatic Brain Injury Population within the First Two Years after Injury:a Systematic Review of the Literature

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ABSTRACT

Background: Human flourishing is a complex phenomenon, the experience of which has been shown to enhance clinical outcomes and quality of life following traumatic brain injury (TBI). Rehabilitation post-TBI focuses on the functional and mental health outcomes for the patient, however a focus on human flourishing using the PERMA framework developed by Seligman provides a more holistic lens through which to view recovery. PERMA is an acronym for the domains of positive effect, engagement, meaning, relationships, and achievement. We therefore reviewed the literature exploring flourishing in the first two years following TBI to see whether opportunities for intervention exist to improve patient outcomes.
Methods: A systematic review was undertaken of the literature to examine which factors act as facilitators or barriers to flourishing within the first 2 years following TBI. Seligman's PERMA framework was used to inform the topic of interest using PRISMA. Four databases were searched: CINAHL, Medline, Embase, and PsycINFO. Search terms were resilience, post traumatic growth, adjustment, thriving, identity, personhood, biograph*, storytelling, new normal, narrative, spiritual*, existential, meaning making, transcendence, inner strength, coping, self-concept, hope, or flourishing. These results were combined with the following terms: traumatic brain injury, acquired brain injury, brain injury, head injury, craniocerebral trauma, head injury, brain injury, closed head injury, ABI, or TBI. Extracted data was analysed using content analysis to create a descriptive summary of the results.
Results: The content of 53 studies published between April 1988 and March 2022, were analysed. 63 factors acting as facilitators and 40 factors acting as barriers to human flourishing in the TBI population were identified. The factors were categorised into individual, social and community, and structural groups and the results presented according to the domains of PERMA. The individual facilitators included the maintenance of an ability to self-reflect and maintain a sense of an inner self or identity. Social and community facilitators included a supportive family and healthy partnerships, and structural facilitators included interventions such as art therapy and dignity conserving care. Conversely, barriers to flourishing included individual factors such as a loss of self, social and community factors such as a lack of family support, and structural factors such as a highly regulated inpatient environment.
Conclusion: There are many factors that act as facilitators and barriers to human flourishing in the TBI population within 2 years of injury. Clinical recommendations include assessing the factors influencing human flourishing for the person with TBI to ensure that appropriate interventions and type of patient care are implemented. This would support the patient to have an experience of flourishing despite the functional deficits resulting from the TBI. Future research could focus on the codesign of an intervention in an inpatient rehabilitation setting to enhance human flourishing.

339 "You're Left on Your Own": A Qualitative Study on the Long-Term Experiences of Community Integration after Traumatic Brain Injury

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ABSTRACT

Introduction: Traumatic brain injury (TBI) can impact various aspects of an individual's life. Individuals with TBI often have complex healthcare needs both in the acute and long-term stages of their injury. As individuals with TBI are navigating through life after the injury, community integration is often a priority to improve quality of life. However, there is little known about the long-term experiences of community integration after TBI.

Objective: To explore the perceptions and experiences of community integration for individuals living with TBI in the community.

Method: This qualitative study used a descriptive phenomenological approach. Data was obtained from focus groups, comprised from a larger mixed-methods study. Participants were recruited through convenience sampling in British Columbia, Canada, and included if they were adults with TBI. A semi-structured interview guide on factors affecting individuals with TBI was developed in collaboration with patient partners with lived experience of TBI. Interviews were conducted with four focus groups, comprising of three to four individuals, online via Zoom. These interviews were audio- and video-recorded, and transcribed verbatim. Data were analyzed using codebook thematic analysis, and multiple investigators were involved in the data analysis process.

Results: Participants included 13 adults with TBI, between the ages of 25 and 64, who sustained their injuries between 1 and more than 20 years ago. Experiences of community integration were illustrated through three themes relating to employment or productive activity, independent living, and social activity: (1) 'Am I left on my own?' explored the support systems available after TBI, (2) 'One size fits all' described the response of society to TBI, and (3) 'Adapting to a new normal' highlighted the response of participants to a changed reality.

Conclusion: Understanding the long-term perceptions and experiences of community integration after TBI can improve public awareness and education to facilitate community integration, through acceptance and understanding. In addition, such perceptions and experiences may inform interventions that help improve the quality of life of individuals with TBI who are living in the community.

340 GUSTO-WORK: A New Food Literacy Intervention to Promote Work Participation. Exploratory Study.

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ABSTRACT

Introduction: Acquired brain injury (ABI), particularly dysexecutive syndrome, can significantly limit daily activities and hinder employment. GUSTO-WORK, a two-month culinary group intervention (2 x/week, 120h), was designed to develop transferable work skills through food literacy-related activities (i.e. meal planning, budgeting, cooking, cleaning. . .). GUSTO-WORK is provided by an occupational therapist in a professional kitchen. In the second month, a chef provided additional instruction to enhance cooking techniques.

Objectives: The study aimed to (1) explore the effects of GUSTO-WORK on cognitive function, real-life cognitive processes, functional displacement, and occupational outcomes, (2) determine whether occupational gains are maintained for three months post-intervention, and (3) document occupational outcomes.

Methods: A single-case experimental design with repeated pre- and post-intervention measures was used with 6 adults with ABI and executive dysfunction (mean age 55 ± 14.85 years, 3 females). Ecological cognitive processes were assessed with the Cooking Task (CT), and work-related personal goals with the Canadian Occupational Performance Measure (COPM). Attention, inhibition, working memory, memory, and displacement under cognitive load were measured using the Test of Everyday Attention (TEA), the Stroop test, the N-back, the Rivermead Behavioural Memory Test (RBMT), and the Timed Up and Go (TUG). For group analysis, changes in average pre- and post-intervention performance were analysed using paired t-tests and Wilcoxon tests, where the mean of all pre-intervention measures was compared to the mean of all post-intervention measures. For individual progress, all measurement points across multiple baselines were analysed using non-overlap of pairs (NAP) and visual analysis of plotted raw data. Statistical significance was set at $p < 0.05$.

Results: Group analysis revealed significant improvements across multiple domains. In the cognitive domain, participants showed better recall in both visual ($p = 0.027$) and verbal memory ($p = 0.026$; RBMT), along with improved visual target search ($p = 0.044$ and $p = 0.031$; TEA). For functional displacement, significant improvements were observed in basic displacement ($p = 0.018$; TUG 1) and displacement under cognitive load ($p = 0.010$; Dual TUG 1). For cooking performance, results revealed fewer total errors ($p < 0.001$), fewer control errors ($p = 0.007$), and reduced context neglect ($p = 0.011$; CT). No significant change was observed in Stroop performance. The NAP analysis nuanced these group findings by highlighting individual variability in performance evolution over time. Occupational outcomes were positive for 5 of 6 participants, with significant improvements in goal performance and satisfaction (COPM). At the end of the program, one participant continued rehabilitation, two retired to voluntary work, and three returned to work.

Conclusions: GUSTO-WORK showed potential for cognitive and functional improvements in real-life contexts for adults with ABI and executive dysfunction. The occupational gains observed suggest that the skills developed were transferable, supporting community participation and workplace reintegration

341 Digital Symptom Mapping for People with Persistent Postconcussion Symptoms: Development and Usability of an mHealth Application

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ABSTRACT

BACKGROUND: Concussions are common, and a substantial proportion of people experience persistent symptoms. Persistent postconcussion symptoms (PPCS) interfere with people's work- and social life and are associated with lower health-related quality of life. Symptom complexity is a challenge in diagnostics and treatment of the condition. A mobile health application (mHealth app) may be an accessible tool for symptom mapping and facilitating symptom management for people with PPCS. OBJECTIVE: To develop a research-based mobile application for personalized symptom mapping for people with PPCS and investigate its usability and safety. METHODS: This development- and usability study consisted of three iterative cycles each containing: a) app usability evaluation by a user group, b) app review by a clinician group, and c) app designing and programming. The user group attended 2-hour usability testing sessions in a hospital setting in the first two cycles. In the third cycle, they conducted a 4-week home testing. The clinician group attended 1-hour app reviews in their work environments in all cycles. Usability was measured using the mHealth App Usability Questionnaire for the user group (7-point Likert scale) and the Mobile App Rating Scale for the clinicians group (5-point Likert scale). Qualitative interviews further informed the development process in all cycles. Safety was evaluated based on the frequency of adverse and serious adverse events during the study period. RESULTS: Twenty-three adults (age 21-69, 80% females) with PPCS were included in a user group, and six clinicians (mean age 49, 50% females), with a mean of 13 years of work experience with people with PPCS, were included in a clinician group. The user group had a mean score of 5.0 on the mHealth App Usability Questionnaire and the clinician group had a mean score of 4.1 on the Mobile App Rating Scale. The qualitative interviews provided important insight for the development and improvement of the app, and the study revealed challenges with technical implementation that should be mitigated in future versions for enhanced user experience. Two adverse events related to increased awareness of symptoms were logged during the home testing. No severe adverse events were logged during the study period. CONCLUSION: We developed an mHealth application for symptom mapping for people with PPCS based on feedback from users and clinicians in an extensive iterative development process. The app generally received high usability scores from both the user and clinician groups, and it is safe to use for its intended purpose. The mHealth application is an acceptable tool for symptom mapping, and the effect on symptom management and possible side effects should be further investigated in a larger clinical trial.

342 Enriching the lives of children with acquired brain injury and caregivers: A qualitative study of peer mentorship experiences in a community setting

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ABSTRACT

Background: The World Health Organization aims to strengthen community-based rehabilitation for people with disabilities. Peer-based community interventions can promote this objective. Active Rehabilitation is one such intervention that provides structured peer support from peer mentors through residential training camps. Currently, there is limited evidence about the impact of Active Rehabilitation camps or similar community peer-based interventions on children with acquired brain injury. This qualitative study explores the experiences of children with acquired brain injury and their caregivers in Active Rehabilitation camps.

MethodsS: We observed and interviewed nine children with acquired brain injury and ten caregivers participating in Brain Camp Yng 2022, a week-long Active Rehabilitation camp in Norway. We interviewed participants twice: immediately after the camp and after six months. We utilised an abductive thematic analysis and interpreted the results using the Self-determination theory.

Results: We constructed three subthemes and one overarching theme. The first subtheme, "Interacting with peers made me smarter", reflects how study participants gained new knowledge about brain injury and how to manage subsequent impairments. The second subtheme, "Nudging from peer mentors made me feel better", explores how the children's motivation, confidence, and mastery improved through involvement in sports and leisure activities and peer mentors' encouragement. It also highlights how the caregivers were

inspired to support their children's independence in daily activities. The third subtheme, "A sense of companionship through meeting peers", describes how children, caregivers, and mentors connected and how these meetings made study participants feel less isolated and provided hope for the future. Peer mentors were perceived as essential in facilitating knowledge gain, personal growth, and network building for children with acquired brain injury and caregivers. This is reflected in the study's overarching theme, "Active Rehabilitation peer mentorship camps enrich the lives of children with acquired brain injury and their caregivers". This theme also incorporates sports and leisure activities and a safe and supportive camp environment, which was essential for the children's and caregivers' experiences. In line with the Self-determination theory, many of the study participants' experiences may be facilitated by nourishing basic psychological needs and elements of high-quality relationships.
Conclusions: Despite the short duration, Brain Camp Yng provided children with acquired brain injury and caregivers with valuable knowledge and experiences. Study participants expressed that the camp offered a supportive environment, encouraging the children's enjoyment, mastery, motivation, self-worth, and injury management. Moreover, the children developed meaningful relationships with peers and mentors. Caregivers found great value in the support network they formed. Camp participation gave them newfound insight into brain injury, which led to positive changes in their parenting approaches (i.e., increased patience and reduced assistance with daily activities). Furthermore, meeting mentors gave them a more positive outlook on their children's future.

343 Pretesting and Content Validity of the Dutch La Trobe Communication Questionnaire (LCQ): A Cognitive Interview Study with Individuals with Brain Injury and Close-others

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ABSTRACT

Background: Cognitive communication disorders (CCDs) are common after acquired brain injury (ABI) and may negatively affect quality of life. Unfortunately, CCDs often go unnoticed and hence individuals often remain undertreated. Although the assessment of CCDs after ABI is thus of great importance, there is a lack of Dutch scientifically validated measurement instruments for assessing CCDs after ABI. Therefore, translation and cross-cultural adaptation of available measurement instruments that are designed for this purpose is highly needed. The La Trobe Communication Questionnaire (LCQ) has been specifically designed to measure perceived communicative ability after ABI from the perspective of individuals with ABI and close-others. To date, no version of this questionnaire is available for use in the Dutch population.
Objectives: To translate and cross-culturally adapt the LCQ into Dutch language, to pretest the Dutch prefinal version in individuals with ABI and close-others and to evaluate the content validity of the LCQ.
Methods: The LCQ was translated into Dutch following international guidelines, including forward- and backward translations. The prefinal version of the Dutch LCQ was then cognitively pretested in a sample of 7 individuals with ABI and 8 close-others in accordance with the WHO guidelines (Process of translation and adaptation of instruments) and the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) for the evaluation of content validity of Patient-Reported Outcome Measurements (PROMS). During the semi structured interviews, participants filled out the questionnaire and answered questions about the comprehensibility of the instructions, response options and about each individual item of the questionnaire. In addition, participants rated comprehensiveness of the questionnaire on a 5-point Likert scale, as well as the relevance of each individual item for the construct, population and context of use.
Results: All individuals with ABI and close-others were able to fill out the LCQ independently. At first glance, participants overall reported the Dutch LCQ to be comprehensive and relevant. Several suggestions for improving the comprehensibility of some items were provided.
Conclusions: Results of this study will provide information on proposed adjustments and final revisions that have been made to finalize the Dutch version of the LCQ, as well as on the content validity of the LCQ. As final analyses are currently being performed, the final and official version of the Dutch LCQ is expected to be available at the end of 2024.

345 Factors Associated with Cardiovascular Mortality after Traumatic Brain Injury (TBI): A TBI Model Systems Study

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ABSTRACT

Objectives: Cardiovascular disease is the leading cause of death in the United States. Prior research suggests that individuals with traumatic brain injury (TBI) have an elevated risk of death from cardiovascular disease compared with the general population. The purpose of this project is to characterize the factors associated with death due to cardiovascular causes following complicated mild to severe TBI.

Methods: This study included 16,166 participants with complicated mild to severe TBI enrolled in the TBI Model Systems database. The TBI Model Systems enrolls individuals aged 16-years and older during inpatient rehabilitation admission following complicated mild to severe TBI, and completes follow-up interviews at 1-year, 2-years, 5-years, and every 5 years thereafter post-injury up to 30 years post-injury. Cause of death was determined using primary cause of death listed on death certificates. Primary cause of death was identified as being due to cardiovascular causes if the primary cause of death was coded with ICD-9 codes 390-459 or ICD-10 codes I00-I99, which correspond to diseases of the circulatory system. Individuals who died with unknown primary cause of death were excluded. A competing risk regression analysis was completed to identify demographic and injury related factors associated with increased risk of mortality due to cardiovascular-related causes.

Results: Overall, 2,767 (17.1%) individuals died, of which 596 (21.5%) died due to cardiovascular related causes and 2,171 (78.5%) died due to other causes. Those who died due to cardiovascular causes were older (sub distribution hazard ratio [SHR] 1.060, 95% 1.051 – 1.068, $p < 0.001$), more likely to be male (SHR 1.399, 95% CI 1.124 – 1.741, $p = 0.003$) or divorced at time of injury (SHR 1.567, 95% CI 1.091 – 2.250, $p = 0.015$), and had lower functional independence measure (FIM) motor scores at inpatient rehabilitation discharge (SHR 0.991, 95% CI 0.985 – 0.998, $p = 0.015$). Conversely, individuals who identified as Asian/Pacific Islander (SHR 0.359, 95% CI 0.146 – 0.885, $p = 0.026$) and had at least a high school education (SHR 0.749, 95% CI 0.593 – 0.946, $p = 0.015$) were less likely to die due to cardiovascular causes. Pre-morbid alcohol or drug use, duration of PTA, FIM cognitive score at inpatient rehabilitation discharge, payor source for inpatient rehabilitation admission, and region lived at time of injury were not significantly associated with death due to cardiovascular causes.

Conclusions: Cardiovascular related diseases accounted for over one-fifth of deaths following complicated mild to severe TBI. Males, individuals of older age, those who are divorced, and with lower mobility at discharge from inpatient rehabilitation are at increased risk for cardiovascular related death. These findings highlight the need for early screening for cardiovascular risk factors after TBI, particularly for those with increased risk of cardiovascular-related mortality.

346 Assessing Muscle Architecture with Ultrasound: Implications for Spasticity

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ABSTRACT

Botulinum Neurotoxin Type A (BoNT-A) injections using Ultrasound (US) guidance have led to research evaluating changes in muscle architecture. Controversy remains as to what constitutes increased Echo-Intensity (EI) in spastic muscles and whether this may affect outcomes. We aim to provide a narrative review of US muscle architecture changes following Central Nervous System (CNS) lesions and explore their relationship to spasticity. Medline, CINAHL, and Embase databases were searched with keywords: ultrasonography, hypertonia, spasticity, fibrosis, and Heckmatt. Three physicians reviewed the results of the search to select relevant papers. Reviews identified in the search were used as a resource to identify additional studies. A total of 68 papers were included. Four themes were identified, including histopathological changes in spastic muscle, effects of BoNT-A on the muscle structure, available US modalities to assess the muscle, and utility of US assessment in clinical spasticity. Histopathological studies revealed atrophic and fibro-fatty changes after CNS lesions. Several papers described BoNT-A injections contributing to those modifications. These changes translated to increased EI. The exact significance of increased muscle EI remains unclear. The Modified Heckmatt Scale (MHS) is a validated tool for grading muscle EI in spasticity. The use of the US may be an important tool to assess muscle architecture changes in spasticity and improve spasticity management. Treatment algorithms may be developed based on the degree of EI. Further research is needed to determine the incidence and impact of these EI changes in spastic muscles.

353 Life Goes On: Wellbeing And Neuropsychiatric Symptoms In Institutionalized Brain Injury Patients

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ABSTRACT

Introduction: A significant proportion of patients surviving severe brain injury needs 24-hour care for the rest of their lives. Not being able to live independently anymore is a worst-case scenario for many healthy people. But for patients with acquired brain injury (ABI) and their loved-ones, life goes on, even when it's no longer within the familiarity and comfort of one's own home. People with ABI may mourn what they have lost through their injuries, or feel stuck with their impairments, but they also continue to enjoy things, to have hopes and dreams. ABI patients tend to be much younger than the average nursing home population and may have decades ahead of them. Decades they, like any other person, want to fill with a meaningful, pleasurable life.

Challenge: In this universal aspiration, a major challenge is brought forth by the high prevalence of neuropsychiatric symptoms (NPS) after ABI. NPS, such as apathy, disinhibition, irritability, depression, anxiety and aggression, may be more likely to manifest after hospital discharge than during the initial admission. Symptoms may be persistent and even worsen over time. Caregiver burden increases significantly with cognitive dysfunction, behavioral symptoms, and impaired functional status of patients. NPS have a negative impact on the quality of life of people with ABI. But until now, little is known about which symptoms affect quality of life in what way. A complicating factor is that quality of life instruments often rely on self-reporting and communication skills which not all people with ABI are having any more. This means that gaining insight into the interaction between neuropsychiatric symptoms and quality of life of people with ABI is not easy to investigate. LIFE GOES ON

'Life Goes On' is a mixed-methods study on wellbeing in patients with ABI, and how this relates to their neuropsychiatric symptoms. In addition to established, quantitative scales, Life Goes On will invite ABI patients living in various kinds of health care institutions and their proxies to talk about their views on quality of life in a more inclusive way. The knowledge gained in Life Goes On will allow patients' voices to lead future care program development, so that ABI patients and their loved-ones can enjoy more evidence-based, personalized care in the near future.

Approach: Quantitative analysis of an existing database on NPS and QOL with semi-structured interviews about established quality of life domains; Participants: patients <65 years of age with ABI in nursing homes and other long term care facilities within the Netherlands, and their representatives; Output: multi-domain insight into the relation between quality of life and NPS in ABI patients in long-term care facilities, to be used to improve wellbeing for patients in the near future in both care and policy

354 hear Me: Investigating the Nature of Gesture in Patients with Prolonged Disorders of Consciousness

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ABSTRACT

Patients with Prolonged Disorders of Consciousness (PDoC), lasting ≥ 28 days, often exhibit preserved movements after emerging from a coma. However, whether these movements are reflexive/patterned or intended actions remains unclear, raising critical questions about the presence of awareness of the self and the environment in these individuals, and creating emotionally difficult situations for their caregivers. Conventional behavioral assessments alone cannot accurately classify these movements, as they may appear reflexive or patterned to the naked eye, despite potentially being intentional. In contrast, existing approaches based solely on neuroimaging (e.g., EEG and fMRI) focus exclusively on brain dynamics, neglecting behavioral data.

Methods: Therefore, to classify these movements, this study employs a multimodal approach integrating both behavioral and electrophysiological data. We employ body gesture tracking (joint movement in upper limbs and face gestures) through a camera and MediaPipe software, alongside high-density (128-electrode) electroencephalography (EEG), galvanic skin response (GSR), and heart rate variability (HRV). High-density EEG is used to examine the temporal dynamics of the Dorsal Attention Network (DAT), which is believed to be associated with goal-directed attention. GSR and HRV are used as indicators of arousal.

Experiment: The "Hear Me" experiment involves three phases: resting state, passive listening, and active listening, during which all sensors collect data. In the passive phase, patients listen to music without interaction. During active listening, they can regulate the presence or absence of music through body gestures (e.g., hand movements and eye blinks).

Hypotheses: 1) DAT will be activated only when there is an intent to interact with the music. 2) The overall GSR and HRV activity will be elevated during the active phase compared to the passive phase if the patients are engaged in the task.

Conclusions: This experiment aims to identify goal-oriented gestures and potentially reveal covert consciousness during patients' engagement with the music. By integrating behavioral and physiological data, this multimodal approach offers deeper insights into the nature of patient movements through the detection of arousal and conscious awareness in PDoC. We

believe that the findings from this study could improve the assessment of the state of consciousness in PDoC and pave the way for Brain-Computer Interfaces (BCIs) that enable communication with them.

355 Conscious But Confused – What's In A Name?

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ABSTRACT

Introduction: Brain-injured patients emerging from hyporesponsive syndromes, such as coma and the minimally conscious state, often show cognitive disturbance on multiple domains combined with waxing and waning arousal. This phase has various aliases, such as Post-Traumatic Amnesia, (Post-Traumatic/ Acute) Confusional State and Delirium. We seek to determine which term is most likely to be adapted throughout the chain of care for acquired brain injury patients and to promote better understanding and management.

Person Experience: Hella, 18 years of age, on a particularly stressful time during her rehabilitation following subarachnoid hemorrhage: 'I remember waking up in a hospital bed without understanding the space or time I was in. In order to get a grip on things, I tried to recall usual stuff, such as my phone number – which I remembered – my address – which I remembered too – but I got stuck when I tried to recall my age. I was sure I had passed the age of 17, but also that that happened quite some time ago. I just lost it. The nurse didn't know my date of birth from heart, and it dawned on me: my mother wasn't here, these people didn't really know me – I was not in good hands. Over the next weeks, I was cared for by nurses who seemed to know me while I felt I saw them for the first time. I was in tears regularly because my mother hadn't visited me for weeks, even though she came by every day. Memory loss and confusion on this level cause such deep loneliness, as when the people close to you leave the room, their visit often doesn't leave a lasting, or any, impression'.

Discussion: Multi-domain cognitive disturbance combined with fluctuating arousal is a transient, but impactful sequela of acquired injury. Swift recognition is crucial for treatment improvement and epidemiologic and pathophysiologic research (quoting soccer player Johan Cruijff: 'You have to notice it before you see it'). The use of different terms for this condition hampers its identification as a clinical and scientific target. Adjectives concerning etiology ('post-traumatic') incorrectly suggest the condition is unique to specific mechanisms of brain injury. The term 'post-traumatic amnesia' should no longer be used as patients invariably display disturbances on different cognitive domains as well as behavioral symptoms. Diagnostic criteria for the terms 'delirium' (preferred term according to AAN and 9 other significant medicoscientific societies) and 'confusional state' (arising from the field of expertise on prolonged disorders of consciousness) are virtually identical. 'Delirium' may steer clinicians towards the prescription of antipsychotic drugs. The international brain injury community should adapt the term 'confusional state' and implement its use throughout the chain of brain injury care.

356 Real-Life Outcome Measures Through the Perspective of Individuals with Cognitive Communication Disorders After Brain Injury: Developing a VR Assessment Tool Using Co-Design Methodology

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ABSTRACT

Introduction: Cognitive and communication disorders (CCDs) after acquired brain injury (ABI) typically have a considerable negative impact on successful social and vocational rehabilitation (Douglas et al., 2016, Meulenbroek & Turkstra, 2016). CCDs often affect daily situations that place a high demand on cognitive functions (e.g., communication situations with background noise). Due to their structured, often paper-pencil based format, existing standardised assessment tools cannot reflect these demands of daily life. We therefore aim to develop an innovative, participation-oriented assessment tool for individuals with CCD after ABI. This tool, Commbi (Cologne-Bielefeld Communication Assessment Combined), combines two diagnostic approaches: (a) a Patient-Reported Outcome Measure (PROM) for self-evaluation of everyday and vocational communication abilities (Commbi-PROM), and (b) a functional assessment of everyday and vocational communication abilities in real-life oriented communication contexts in virtual reality (Commbi-FUNC(tional)).To ensure the clinical relevance and acceptance of 'Commbi' for people with CCD, we use a co-design approach: Within a module for Patient and Public Involvement and Engagement (PPIE) individuals with CCD

after ABI and their relatives are to be involved in the conception process of Commbi. The talk will outline the results of the first Co-design process, which aimed to identify which communication situation and stressors in daily and vocational life are identified as challenging for individuals with CCD after ABI. Further, consequences for the development of the Commbi will be described.
Methods: Based on a comprehensive literature search, challenging everyday communication situations and scenarios as well as potential items for Commbi-PROM were identified. Subsequently, we conducted semi-structured interviews with individuals with CCD after ABI (n = 5), who aimed at requesting their experiences with challenging communication situations and stressors in everyday life and vocational life. Our interview-manual involved open questions on participants' experiences as well as ratings (e.g., on the importance and/or impact of certain stressors) addressing three different everyday-contexts: (i) communication in vocational context, (ii) public communication with a non-familiar person, and (iii) personal conversation with a familiar person.
Results: Data acquisition is still in progress. The talk will present the results of the first Co-Design phase reporting participants' ratings and experiences of communicative challenges in the different contexts of everyday-communication.
Conclusion and Discussion: The results of our Co-Design interviews will inform the further development of Commbi-FUNC and Commbi-PROM.

357 Relationships Between Neighborhood Disadvantage, Race/Ethnicity and Neurobehavioral Symptoms Among Veterans with Mild Traumatic Brain Injury

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ABSTRACT

Importance: Veterans with mild traumatic brain injury (mTBI) face increased risk for vestibular (e.g., dizziness), sensory (e.g., headache), cognitive (e.g., forgetfulness), and mood-related (e.g., irritability) challenges. While these neurobehavioral symptoms generally resolve within three months, a subset of Veterans experience persistent challenges. Despite substantial research, there remains limited understanding of risk factors for persistent symptoms among Veterans with mTBI. Emerging evidence suggests that neighborhood disadvantage, or the lack of social and material resources associated with one's neighborhood (e.g., low employment), may be an under-researched risk factor for persistent symptoms. Further, the presence of social risk factors co-occurring with neighborhood disadvantage may produce a compounding effect, resulting in especially severe symptoms. In particular, underrepresented Veterans with mTBI (e.g., non-White race or Hispanic ethnicity) are at disproportionate risk for neurobehavioral symptoms. Thus, the intersection of underrepresented race/ethnicity and neighborhood deprivation may produce particularly severe neurobehavioral symptoms among Veterans with mTBI. However, whether underrepresented Veterans with mTBI living in disadvantaged neighborhoods experience exacerbated symptoms relative to White, non-Hispanic Veterans and/or those with lesser neighborhood disadvantage remains unknown.
Objective: To examine whether neighborhood disadvantage is associated with more severe neurobehavioral symptoms among Veterans with mTBI; and whether Veterans in underrepresented racial/ethnic groups with high neighborhood disadvantage experience the most severe symptoms.
Methods: This was a retrospective cohort study of Veterans with the following data available in the electronic health record (2014-2020): 1) clinician-confirmed mTBI and complete Neurobehavioral Symptom Inventory as part of their Comprehensive Traumatic Brain Injury Evaluation; and, 2) Area Deprivation Index scores assessing neighborhood disadvantage from the same quarter as their CTBIE. Latent variable regression was used to examine unique and interactive relationships between neighborhood disadvantage, race/ethnicity and vestibular, sensory, cognitive, and mood-related symptoms. Estimates were adjusted for sociodemographic (e.g., gender) and clinical characteristics (e.g., co-morbid psychiatric condition).
Results: The study included 58,698 eligible Veterans. Relative to Veterans with the least neighborhood disadvantage, Veterans with greater neighborhood disadvantage reported more severe vestibular, sensory, mood-behavioral and cognitive symptoms. The strongest associations between neighborhood disadvantage and neurobehavioral symptoms were observed within the sensory (β = 0.07-0.16) and mood-behavioral domains (β = 0.06-0.15). Statistical interactions indicated that relative to White, non-Hispanic Veterans, the association between neighborhood disadvantage and neurobehavioral symptom severity did not differ among those in underrepresented groups (ps > .05).
Conclusions: Veterans with mTBI living in more disadvantaged neighborhoods reported more severe neurobehavioral symptoms relative to those in the most advantaged neighborhoods, with the strongest relationships detected within the sensory and mood-behavioral domains. While neighborhood disadvantage and underrepresented race/ethnicity were both independently associated with symptoms, these factors did not interact to produce especially negative outcomes. Findings

suggest that addressing factors driving socioeconomic disadvantage may assist in mitigating symptoms in this population.

358 COCO (Concussion Communication) Knowledge Mobilisation Program: Development of an Educational Kit for Early Childhood Educators

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ABSTRACT

Concussion is prevalent in young children (i.e., children 8 years old and younger). Using developmentally appropriate measures and methods, studies show that young children experience postconcussive symptoms, just as their older peers do, but that they may manifest in unique ways (Beauchamp et al., 2024, Dupont et al, 2024, Crowe et al, 2019). In some cases, early childhood concussion can have lasting behavioral impacts (Gagner et al., 2021). The ability of caregivers to recognize and detect signs and symptoms of a possible concussion is a cornerstone of concussion diagnosis and management. However, most knowledge mobilisation (KM) initiatives and studies focus on children 8 years and older and on sports and school settings (e.g., Mallory et al., 2022; McKinlay & Buck, 2019). Given the specific challenges in detecting signs and symptoms in this age group due to cognitive and language limitations, unique mechanisms of injury and symptom patterns, and considering the distinct environments in which most young children evolve (e.g., formal daycare, preschool, home), there is a clear need for tailored KM products to inform childcare educators about early childhood concussion.

Objective: This study is part of the COCO (Concussion Communication) KM program and aims to develop and assess the utility of an Educational Kit on early childhood concussion intended for teachers and students in early childhood education programs.

Methods: A collaborative and iterative approach was used to create tailored educational products based on literature, focus groups and consultations with experts and practitioners from various discipline: pediatric emergency medicine, childcare services, neuropsychology, communication and teaching. KM products were tested using in-person training sessions with 69 childcare staff and directors, and future early childhood educators. Surveys and focus groups were used to collect information on appreciation, ease of use, perceived usefulness, knowledge increase and intent to use the KM products in the future.

Results: The COCO Educational Kit consists of a 60 to 90 minutes training kit including a presentation, a detection tool, case studies and a learning assessment. Most perceived the KM products to be of adequate level of difficulty (58%), or easy to very easy (47%). The perceived level of knowledge on concussion increased from 4.2/10 (SD=2.58) before the training to 7.6/10 (SD=1.40) after the training. 92% reported they would use the detection tool in their future practice.

Conclusions: The COCO Educational Kit is a promising tool to empower educators in identifying possible concussions and responding adequately. It could also be of use for other individuals who work with young children (e.g., coaches, teachers, daycamp staff). Next steps include adapting the COCO KM products to various key early childhood actors, and developing an online version to increase access to a larger public.

359 Gaps in Guideline-concordant Insomnia Disorder Treatment among Veterans Receiving Polytrauma/Traumatic Brain Injury Services

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ABSTRACT

Importance: Sleep problems are common and disabling among Veterans with traumatic brain injury (TBI), often reflecting underlying conditions such as insomnia disorder, rates of which are higher among individuals with TBI. Insomnia is characterized by difficulty initiating or maintaining sleep, waking earlier than desired, and daytime impairment. High-quality sleep is essential for recovery from TBI and overall well-being, making effective management of insomnia disorder essential for this population. Insomnia treatment for Veterans with TBI is often initiated within the Veterans Health Administration (VHA) Polytrauma/TBI System of Care (PSC), a national network of interdisciplinary teams with specialized expertise in TBI and related conditions. Insomnia treatment in this setting should follow VA/DoD Clinical Practice Guidelines, which include a recommendation that cognitive behavioral therapy for insomnia (CBT-I) be provided as first-line treatment over sleep medications. This recommendation is based on evidence

that CBT-I provides longer-lasting benefits and that medications can have side effects, some of which are especially salient for Veterans with TBI (e.g., potential for abuse). While gaps in guideline-concordant insomnia treatment have been noted in other VHA settings, little is known regarding insomnia disorder treatment among Veterans receiving PSC services.
Objective: First, to describe guideline-concordant receipt of CBT-I vs. sleep medications among Veterans receiving PSC services. Second, to identify patient- and facility-level factors associated with receipt of CBT-I vs. sleep medications in this population.
Methods: This retrospective cohort study analyzed VHA medical records of Veterans who: 1) received their first PSC encounter after 10/1/2019; and, 2) received either CBT-I or a newly prescribed sleep medication in the year following their initial PSC encounter (with no prior treatment in the preceding two years). A descriptive analysis examined the receipt of CBT-I vs. sleep medications. Mixed effects regression modelled the likelihood of receiving first-line CBT-I vs. sleep medications based on sociodemographic (e.g., age), clinical (e.g., psychiatric conditions), spatial access (e.g., drive time), and facility-level factors (e.g., facility complexity).
Results: Among the 18,293 Veterans receiving insomnia disorder treatment, only 11% received first-line CBT-I. Older Veterans; Native Hawaiian/Pacific Islander and Hispanic Veterans; those with bipolar disorder, depression, and alcohol use or other substance use disorder; and those with extended drive times were less likely to receive CBT-I.
Conclusions: Adherence to guidelines recommending CBT-I over sleep medications is low within the PSC, which may undermine long-term outcomes and increase exposure to sleep medication side effects among Veterans with TBI. Future research is needed to clarify barriers to delivering CBT-I in the PSC and to develop targeted strategies for promoting its implementation, especially among older, geographically disadvantaged Veterans, as well as those with psychiatric or substance use disorders.

360 Mixed Methods Feasibility and Face Validity Evaluation of R2Play: A Novel Multidomain Return-to-Play Assessment Tool for Concussion

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ABSTRACT

Background: Guidelines for concussion management recommend a multimodal approach to assessing readiness for return-to-play (RtoP) including symptoms, balance, exertion, and cognition. However, existing assessments do not reflect the speed or complexity of multidomain skill integration in sport. We previously established proof-of-concept for R2Play, a dynamic multidomain RtoP assessment tool, among healthy youth by demonstrating alignment with initial design objectives.
Objectives: (1) Assess the feasibility of R2Play in youth with a history of concussion; (2) Examine youths' physical exertion during R2Play as a preliminary marker of face validity; (3) Understand clinician and youth perspectives on the feasibility, face validity, utility, and challenges associated with R2Play.
Methods: Convergent parallel mixed methods design. Clinicians were paired with youth with a history of concussion to complete R2Play together and provide feedback through individual semi-structured interviews. Feasibility was assessed based on usability (clinician ratings on System Usability Scale, observable user errors), reliability (technical issues), practicality (clinician training evaluation, R2Play assessment duration), and safety (symptom exacerbation, adverse events). Exertion was evaluated against a target of youth achieving ≥ 80% of age-predicted maximal heart rate or rating of perceived exertion ≥ 7/10. Interviews explored perspectives on feasibility domains and face validity and were analyzed using content analysis. Quantitative and qualitative results were merged via joint display to identify areas of convergence, divergence, and complementarity.
Results: Participants included 10 youth (ages 13-20 years) with diverse sport experiences and five clinicians (n= 2 physiotherapists, n= 2 occupational therapists, n= 1 kinesiologist). Success criteria were met or approached for all feasibility domains. Clinician-rated usability was good-to-excellent (SUS= 84.00± 6.02) and youth reported that instructions were easy to learn. There were no user or technical errors causing assessment cessation. Assessments were configured in 5.74± 1.09 minutes and completed in 26.50± 6.02 minutes. There were no safety incidents or symptom exacerbation requiring assessment modification or cessation. R2Play elicited vigorous intensity physical exertion (peak HR= 90.10± 5.78% age-predicted maximal, peak RPE= 5.50± 1.72), with target exertion criteria met for 9/10 youth. Clinicians and youth discussed how R2Play reflects key elements of sport across physical, cognitive, and perceptual domains, making it a potentially valuable tool for assessing readiness to RtoP and informing rehabilitation treatment planning post-concussion. Mixed methods meta-inferences provided enhanced insights regarding how to improve the usability, practicality, safety and face validity of R2Play.
Conclusions: Findings support the preliminary feasibility and face validity of R2Play, a new multidomain RtoP assessment tool for concussion, with excellent usability, vigorous physical exertion requirements, and promising feedback regarding its potential to fill gaps in the RtoP process. An ongoing multicenter study aims to establish the cross-site feasibility of R2Play and evaluate its face and content validity by demonstrating the physical, cognitive, and perceptual loading of assessment levels.

361 Evaluation of a Clinical Decision Support Tool for Sleep Disorder Screening and Treatment Among Veterans Receiving Polytrauma/Traumatic Brain Injury Services

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ABSTRACT

Importance: Sleep problems are common and disabling among Veterans with traumatic brain injury (TBI), often reflecting underlying conditions such as insomnia disorder and obstructive sleep apnea (OSA), rates of which are higher among individuals with TBI. High-quality sleep is essential for recovery from TBI and overall well-being, making the effective management of sleep disorders critical for this population. Sleep disorder management for Veterans with TBI is often initiated within the Veterans Health Administration (VHA) Polytrauma/TBI System of Care (PSC), a national network of interdisciplinary clinical teams with specialized expertise in TBI and related conditions. Sleep disorder management in this setting should follow the VA/DoD Clinical Practice Guideline for Chronic Insomnia and OSA, which outlines comprehensive management of sleep disorders, from screening symptomatic patients using standardized assessments for insomnia (Insomnia Severity Index) and OSA (STOP questionnaire), to evidence-based treatment recommendations. In our prior work, PSC providers identified substantial barriers to implementing guideline-recommended sleep disorder management (e.g., limited awareness of recommendations), and emphasized the need for decision support. Accordingly, we developed Sleep Disorder Management Assistance for Providers and Patients (Sleep MAPP), a clinical decision support tool which leverages electronic medical record (EMR) data to: 1) identify Veterans in need of sleep disorder assessment; 2) asynchronously administer the ISI and STOP; and, 3) offer guideline-concordant treatment recommendations.

Objective: To elicit provider perspectives regarding the usability, acceptability, and feasibility of the Sleep MAPP prototype before integrating it into routine PSC services.

Methods: Seven VHA providers involved in TBI and/or sleep disorder management participated in a convergent parallel mixed methods design. Providers tested Sleep MAPP and offered feedback using semi-structured interviews and standardized assessments of usability (System Usability Scale), acceptability (Acceptability of Intervention Measure), and feasibility (Feasibility of Intervention Measure). Qualitative data was analyzed using a Descriptive and Interpretive approach; a descriptive analysis summarized quantitative data. A joint display table synthesized both data sets, leading to overall conclusions about usability, acceptability, and feasibility.

Results: Providers found Sleep MAPP easy to use, highlighting its intuitive functionality and helpful visual features. However, they emphasized the need for technical support and training. Sleep MAPP was seen as acceptable, facilitating time-efficient assessment and treatment of sleep disorders with the potential to improve care quality and clinical outcomes. Changes to EMR variable definitions were recommended to increase acceptability. Sleep MAPP was considered feasible to implement, though outlining a clear implementation blueprint and accounting for staffing and time constraints were recommended.

Conclusions: Sleep MAPP was considered usable, acceptable, and feasible to implement. Provider feedback will guide revisions to the tool and the development of an implementation blueprint to integrate Sleep MAPP into routine PSC services, enhancing care quality and outcomes among Veterans with TBI and sleep disorders.

362 Personality Profiles and Emotional Regulation in Recovery After Mild Traumatic Brain Injury

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ABSTRACT

Introduction: Approximately 70-90% of traumatic brain injury experienced are classified as mild (mTBI). MTBIs are characterized by immediate and transient changes in brain function that result from a complex series of metabolic events. In general, patients experience pronounced symptoms and difficulties within the first 72 hours, which diminish over the first two weeks before disappearing completely after 3 months. However, 10 to 25% of patients will continue to report persistent and disabling symptoms during the chronic phase, i.e. more than 3 months after the event. Considering the prevalence of mTBIs, this percentage translates into a considerable number of people who will experience a reduction in well-being. Existing research has indicated that the onset, intensity and duration of mild post-mTBI symptoms are influenced by a combination of factors related to the lesion itself (mainly neurological) and, above all, factors unrelated to the lesion (mainly psychological). It is then likely that the complex interplay between the individual's set of pre-existing characteristics (e.g., personality traits and emotion management) and the impact of the injury play a predominant role in maintaining problems post-mTBI. In turn, this could prevent some patients

from returning to their pre-injury level of functioning. However, these factors have not been exhaustively studied in reference to mTBI recovery. Thus, the aim of this study is to document the personality profiles and emotional regulation of patients with and without persistent symptoms after mTBI.
Methods: Until now, 26 patients were recruited from Montreal's Hôpital Sacré-Coeur and separated into two groups: 12 with a favorable outcome (OC+) and 14 with an unfavorable outcome (OC-) based on their symptoms three months after the accident on the Rivermead Questionnaire. Patients completed the Minnesota Multiphasic Personality Inventory-3 (MMPI-3), the Emotional Regulation Questionnaire and the Impact of Event Scale.
Preliminary Results: Two-way T-tests (comparing the OC- and OC+ groups) revealed differences in the MMPI-3 somatization and neuroticism scales, with significantly higher scores for the OC- group. There were also differences in emotional regulation strategies, with significantly higher scores for inadequate strategies in the OC- group. Finally, a significant difference was found on the Impact of Event Scale: the OC- group had higher scores than the OC+ group.
Conclusions: These results indicate that individuals with persistent symptoms after mTBI show distinct psychological and emotional patterns compared to those with a favorable recovery (higher somatization and neuroticism, maladaptive emotional regulation strategies and accident impact). The data from this project will be used to create tailored intervention strategies that are better adapted to the patient's profile and outcome, in order to promote their recovery. Additionally, it will better equip healthcare professionals working with this population.

363 A Rapid Review of Homelessness Prevention Interventions for Individuals with Acquired Brain Injury

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ABSTRACT

Background: It is now well recognized that people experiencing homelessness are much more likely than the general population to have a history of acquired brain injury (ABI), whether traumatic or non-traumatic. Many recent studies show that most people experiencing homelessness have sustained a first ABI before their first episode of homelessness. This indicates a possibility and need for targeted homelessness prevention interventions after an ABI, particularly for individuals who present with prior psychosocial vulnerabilities. In light of this phenomenon and given the rapid increase in people experiencing homelessness in Québec (Canada), public officials identified the need for a knowledge synthesis on homelessness prevention for this population.
Methods: Our team conducted a rapid literature review to identify and characterize secondary and tertiary homelessness prevention interventions, using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist and Cochrane recommendations for rapid reviews. Two independent analysts applied the search strategy and conducted the study selection, data extraction, data analysis and synthesis, and quality assessment.
Results: We identified 2771 studies through the searches. Twenty articles were selected and analyzed. Eleven of these articles examined secondary homelessness prevention interventions in various settings: correctional and justice-related facilities (n=7), community or home settings (n=3), and physical rehabilitation settings (n=1). Secondary homelessness prevention interventions based in correctional and physical rehabilitation facilities have shown positive effects on housing status, functional status, engagement in productive activities, and access to services. Nine articles examined tertiary homelessness prevention interventions within community-based settings such as shelters, medical respite programs, urban health clinics, and intimate partner violence shelters. Tertiary homelessness prevention interventions show promising effects on functional status and access to services, although no longitudinal studies have been conducted to assess medium- or long-term effects on housing outcomes. Common features of homelessness prevention programs include screening for ABI in settings where prevalence of possible ABI is high, ABI-specific training for non-specialized staff in those settings, provision of direct services to service users and caregivers, particularly for behavioral challenges, and cross-sector partnerships and training.
Conclusions: Emerging data from this review show that it is possible, feasible, and promising to prevent homelessness after an ABI. The opportunities and challenges for adaptations of these homelessness prevention interventions in local contexts will be discussed.

364 Pathways and Turning Point into Homelessness for People with an Acquired Brain Injury

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ABSTRACT

Background: Several systematic reviews and meta-analyses show that people experiencing homelessness are more likely than the general population to have a history of acquired brain injury (ABI). Other studies have shown that people experiencing both homelessness and a history of ABI(s) report poorer physical and mental health outcomes than those without a history of ABI(s), as well as more criminal justice involvement and a higher likelihood of repeated ABIs. Little is known about the specific pathways and turning points into homelessness for people with ABIs. The aims of the study were to: (1) identify pathways and turning points into homelessness; (2) explore the experiences, needs and service use of people experiencing homelessness with a history of ABI.
Methods: We conducted a qualitative descriptive study in collaboration with community-based partners in Montréal

and Québec City (Québec, Canada). Participants were 18 years or older, were or had been homeless in the past five years and reported at least one possible ABI in their lifetime. Eligibility was confirmed by using the Ohio State University Traumatic Brain Injury Identification Method, as well as self-reported questions on non-traumatic ABI. Life History Mapping interviews were then conducted with participants. Interviews were transcribed verbatim, and data was analyzed thematically.
Findings: Interviews were completed with 26 participants (62% male, mean age 50.7 years, age range: 21-68). Participants reported a lifetime mean of 4.4 ABIs. Most (77%) reported a first ABI before the age of 18 and 12 (46%) reported a period of repeated head injuries. Four typical pathways into homelessness were identified and showed that, for about half of the participants, ABI acted as the primary turning point into homelessness, either through the effect behavioral or functional challenges that prompted interpersonal conflicts, criminal justice involvement, loss of income and decisional autonomy, and loss of housing. For other participants, ABI was either indistinguishable from the effect of lifelong violence and adversity or contributed minimally to homelessness trajectories. Four themes emerged from the analysis: (1) complex experiences with services from multiple sectors along pathways into and in homelessness; (2) family as a residential safety net; (3) ABI as a barrier to exiting homelessness; (4) complex housing and shelter needs.
Conclusions: The findings from the study point to several missed opportunities across various sectors to prevent and reduce homelessness for people who have sustained an ABI. This calls for cross-sectoral action to fill in the gaps in services.

365 Bridging Evidence to Practice Through the Living Guideline for Pediatric Concussion

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ABSTRACT
2024-2025 updates to the guideline highlight the importance of returning to safe activities, including non-contact aerobic exercise and school while recovering from a concussion. Treatment from an interdisciplinary team is recommended for those not improving after two weeks and right away for those identified as at risk of a prolonged recovery. These updates have led to a paradigm shift in treatment approaches and updated return to activity, sports, and school protocols. Despite the benefits of these advancements, disseminating and implementing updated guidelines to everyone in the circle of care, including frontline healthcare professionals, families, youth, coaches, and teachers, remains a challenge. For example, many healthcare professionals only have access to outdated practice guidelines that suggest complete rest and recommend stopping an activity when symptoms worsen mildly.
To address this gap, our team is collaborating with the TRANSCENDENT Concussion research program's Community Advisory Committee to develop knowledge translated resources aimed at improving guideline dissemination to frontline healthcare professionals, families, and youth. Our initial focus has been on creating an updated and accessible Family Version of the guideline, working alongside individuals with lived experience, community members, and clinical experts, in a co-creation collaborative design process. The goal of this approach is to ensure the resources created and shared are practical and relevant to the needs and priorities of those directly affected by concussions, with the goal of improving uptake.
The living nature of the guideline is an opportunity to continually improve concussion care practices as we learn more about how to treat and prevent this type of mild traumatic brain injury and ultimately improve outcomes. Ongoing collaborative efforts to close the gap between evidence and practice are essential so all individuals involved in pediatric concussion care have access to the latest evidence-based recommendations.

366 Comparison Of Psychiatric Outcomes Between Patients With Traumatic Brain Injury And Non-Accidental Traumatic Brain Injury: A Case-Control Study

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ABSTRACT
Aims: To investigate whether children with non-accidental traumatic brain injury will be at higher risk of psychiatric disorders compared to TBI due to accidental causes.
Methods: A case-control study was conducted using data from the Hong Kong electronic medical record. Clinical data of paediatric patients aged 0 to 18 admitted to public hospitals with TBI between January 2005 and December 2019 were extracted from the Hong Kong Clinical Data Analysis and Reporting,which is a territory-wide database containing clinical data of patients admitted to the public hospitals in Hong Kong. Patients in the sample having records of maltreatment within the same hospital admission episode for TBI were regarded as case subjects, while four control subjects with only TBI diagnosis were matched to each case based on their age, gender and time of admission (i.e. same calendar year and month). The psychiatric disorders of interest were attention deficit/hyperactivity disorder (ADHD), autism spectrum disorder, anxiety disorders, depressive disorders, mood disorders, bipolar disorders, schizophrenia, personality disorders, substance misuse and dependence, and self-harm behaviours. Records of patients' psychiatric conditions were extracted 90 days from their inpatient admission date to 31 December 2023. χ^2 test was performed to compare the prevalence of the psychiatric disorders between cases and controls.
Results: A cohort of 870 patients with records of TBI were followed up between 2006 and 2015. There were 174 non-

accidental TBI patients and 696 TBI control subjects. Non-accidental TBI patients had higher prevalence of ADHD (8.6% vs 4.5%, p = 0.036), depressive disorders (4.0% vs 1.0%, p = 0.011), mood disorders (2.9% vs 0.3%, p = 0.005), personality disorders (1.7% vs 0.1%, p = 0.027) as well as drug misuse and dependence (1.1% vs 0.0%, p = 0.04).
Conclusions: Children with non-accidental TBI had higher risk of psychiatric disorders than TBI due to accidental causes. Our findings suggest the important interplay between environmental stressors and mental health outcomes.

367 Predictors and Correlates of Perceived Memory Decline in Former Professional Rugby League Players

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ABSTRACT

Some contact and collision sport athletes notice a decline in their memory functioning as they age. Memory impairment is a core diagnostic criterion for traumatic encephalopathy syndrome, and former professional collision sport athletes are believed to be at risk for this syndrome. The purpose of this study was to examine predictors and correlates of perceived decline in memory functioning among former elite and professional rugby league players in Australia. Participants were 130 male former elite/professional rugby league players who completed a health survey (age: mean = 51.7, SD = 12.5; 50% of the sample was 43-64 years old). Their first calendar year of elite play was before 1970 for 18.2% of the sample and before 1990 for 60.1%. Their mean number of seasons played at the elite or professional level was 9.9 (SD = 4.3). They were asked 'Compared to how your memory was 5 years ago, how do you think that your memory is now?' with response options of: 'Much Better, Better, The Same, Worse, or Much Worse.' There were 64 (49.2%) former players who endorsed having worse or much worse memory compared to 5 years ago. The two groups (i.e., those with vs. without perceived decline in memory) did not significantly differ in body mass index, number of seasons of elite or professional participation in sports, number of past concussions, or on a composite measure of signs and symptoms of concussions during their playing years (all p-values were greater than .10). The proportions of the sample with perceived memory decline versus no perceived memory decline who had certain health conditions were as follows: high blood pressure = 20.3% vs. 19.7% (p = .930), diabetes = 12.7% vs. 3.1% (p = .043), pain medication use = 46.9% vs. 33.9% (p = .131), headache medication use = 19.1% vs. 9.2% (p = .110), sleep apnea = 24.2% vs. 6.2% [p < .001, odds ratio (OR) = 4.87, 95% confidence interval (CI) = 1.52-15.63], and medications for anxiety or depression = 35.9% vs. 9.2% (p < .001, OR = 5.52, 95% CI = 2.06-14.74). In a multivariate logistic regression model that included age and those six health variables [$\chi 2(7)=22.64$, p=.002; Nagelkerke R2=.22], perceived decline in memory was marginally significantly associated with sleep apnea (OR=4.07, 95% CI=.99-16.65) and being prescribed medications for anxiety or depression (OR=3.64, 95% CI=1.22-10.87). In former professional rugby league players years of exposure to collision sport and concussion history were not associated with perceived decline in memory functioning, whereas sleep apnea and mental health problems were associated with perceived memory decline.

369 A Virtual Clinical Trial of Psychedelics for Disorders of Consciousness

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ABSTRACT

Disorders of consciousness (DoC) encompass several conditions, such as unresponsive wakefulness syndrome (UWS) and minimally conscious state (MCS), with limited treatment

options. Current theories linking brain complexity to consciousness suggest that psychedelic drugs, such as Lysergic Acid Diethylamide (LSD) and psilocybin, hold potential as therapeutic agents for these disorders. Computational modelling offers an ethical precursor to experimental work which can guide future empirical research. In this study, we present a novel computational framework to simulate the effects of LSD and psilocybin in patients with DoC. Whole-brain computational models were constructed at the single-subject level, utilising patient-specific structural connectivity (SC), derived from diffusion-weighted imaging (DWI) tractography, and functional magnetic resonance imaging (fMRI) resting-state BOLD activity. We used previously acquired fMRI data from 52 DoC patients (23 UWS, 29 MCS), comprising 21 with traumatic brain injury and 25 with non-traumatic brain injury, as well as 12 hC after LSD/placebo and 15 hC after psilocybin/placebo. Each brain region's dynamics were modelled by Stuart-Landau oscillators, and model parameters were optimised to ensure the best fit between simulated and empirical fMRI connectivity. We then simulated the administration of LSD and psilocybin on patients with DoC, by applying the changes in parameters between the drug state and the non-drug state in healthy controls to patient models. We assessed simulated treatment effects by calculating the perturbation integration latency index (PILI) at both the baseline and the simulated drug state. The PILI is a modelling-based measure of brain dynamical instability which quantifies the recovery of a perturbed brain region to its basal state. Changes in PILI between baseline and drug-simulated states served as a proxy for potential treatment response. At baseline, PILI values were significantly higher in HC compared to UWS ($z=3.60$, $p<0.001$) and in MCS compared to UWS ($z=2.34$, $p=0.02$). Simulations of LSD on patient models led to significant PILI increases in MCS ($z=4.13$, $p<0.001$) and UWS ($z=2.8$, $p<0.001$) patients. Simulations of psilocybin on patient models also led to significant PILI increases in MCS ($z=3.92$, $p<0.001$) and UWS ($z=3.71$, $p<0.001$) patients. For MCS patients, simulated treatment-related PILI increases were correlated with functional connectivity (FC) ($r=0.66$, $p<0.0001$), whereas in UWS patients, PILI changes were associated with SC strength ($r=0.67$, $p<0.001$). The observed PILI increases during psychedelic simulations suggest that these treatments may shift the brains of DoC patients towards a more critical regime, enhancing sensitivity to perturbations—a foundational concept for this therapeutic approach. Importantly, we identified potential biomarkers for treatment efficacy: in MCS patients, higher baseline FC predicted larger treatment effects, while in UWS patients, SC strength was the key predictor. Here, we contributed to the burgeoning field of computational modelling for personalised medicine and provide an example of available avenues for testing emerging therapies in-silico.

370 how Does It Feel To Be Helped Following a Traumatic Brain Injury (TBI)?: Perceptions of Individuals with TBI Regarding Cognitive Assistance Provided During a Meal Preparation Task

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ABSTRACT

Introduction: Following a traumatic brain injury (TBI), many individuals will require cognitive assistance to complete complex activities, such as meal preparation. Executive dysfunction, which affects the ability to formulate goals, develop plans, execute those plans, and verify whether goals have been adequately attained, is one of the main reasons for needing cognitive assistance. Family caregivers may be called upon to provide this support in everyday activities. Promising solutions, such as assistive technologies for cognition, may also offer personalized assistance while reducing the burden on caregivers. However, while guidelines exist for providing cognitive assistance, little is known about how individuals with TBI perceive the assistance and whether they find it acceptable.
Objective: Document the perceptions of individuals with TBI regarding personalized cognitive assistance provided during a meal preparation task.
Methods: A qualitative descriptive multiple case study was conducted. Five individuals having sustained a moderate to severe TBI at least one year prior were invited to three sessions to explore their perception of personalized cognitive assistance. During session 1, participants were assessed using the IADL Profile, an ecological observation-based tool documenting independence in complex activities, during which cognitive assistance is provided only when necessary. During session 2, a new meal preparation task was selected to challenge each participant based on observed difficulties and assistance needs. Cognitive assistance was offered during this task to help participants achieve their objectives the most by themselves while improving their performance. The last session consisted of an individual interview, during which participants were invited to discuss their perception of the assistance they received using video recordings from the two previous sessions. Interviews were transcribed and analyzed using inductive thematic analysis.
Results: Overall, participants expressed appreciation for the assistance provided during the meal preparation tasks. They highlighted how cognitive assistance helped them better understand the tasks and the steps needed to complete them, follow through efficiently, and remember elements they might

have forgotten. While being guided, participants noted that they had time to think and try things on their own, which gave them a sense of independence. However, although they generally approved of the assistance, they felt it could be intrusive, anxiety-provoking, or unhelpful at times. In such situations, they found that explicit assistance was beneficial, emphasizing the need to adjust support based on the individual's emotional response.
Conclusions: This study highlights the acceptability of cognitive assistance for individuals with TBI, as they pinpointed both the need to be guided and structured in the meal preparation task while having the time and space to try and think by themselves. Further studies could document how to optimize assistance based on these needs, and adjust assistance provided by family caregivers and assistive technologies for cognition accordingly.

371 The Use of Ultrasound in Patients with Disorders of Consciousness: Diagnostic, Prognostic, and Therapeutic Advances

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ABSTRACT

Following acquired brain injuries due to different aetiologies (e.g., traumatic, anoxic, ischemic), patients may end up with Disorders of Consciousness (DoC) characterized by disturbances in self- and/or environmental awareness which can persist for up to many years. Improving both diagnostic and prognostic accuracy in DoC patients is one of the main aims of the current clinical and research agenda since it could help in better orienting rehabilitative interventions. However, the instrumental techniques used so far to this aim are costly (e.g., functional magnetic resonance imaging) and require the patients' transfer into equipped specialized centres most of the time. In overcoming this issue, the use of ultrasound techniques (US) should be considered, since they are inexpensive bedside applicable instruments, and guarantee the acquisition of both brain morphological and blood flow-related information. Unfortunately, experimental data concerning the US application for improving DoC diagnosis are scarce, and their prognostic value has never been explored nowadays. For these reasons, we proposed to adopt the US in both chronic and post-acute DoC patients to search for reliable US measures helping to improve both diagnosis and prognosis. We developed a US acquisition protocol as part of a funded project by the Italian Ministry of Health which has been already adopted on 45 patients with DoC who are currently in follow-up to evaluate the US prognostic value. Moreover, as part of the same project, we planned to use the US as a neuromodulatory technique to boost the DoC level of consciousness. We think that enlarging the knowledge about diagnostic, prognostic, and therapeutic options by adopting feasible and low expensive techniques could be beneficial for patients, families, and national health systems since it can positively affect clinical activities and DoC patients' management.

372 Trajectories of Executive Functioning Following Pediatric Traumatic Brain Injury Based on International Classification Framework

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ABSTRACT

Objective: The current analysis seeks to model the trajectory of executive functioning (EF) following pediatric TBI through the lens of the International Classification Framework (ICF) to unite the understanding and conceptualization of rehabilitative services for this unique population.
Methods: This study is a secondary analysis of data from a longitudinal project that examines return-to-learn supports for students with TBI. Demographic and injury-related information was collected via caregiver report on REDCap. Executive functioning (EF) was measured through the Behavior Rating Inventory of Executive Functioning-2nd Edition-Parent Form (BRIEF-2). Higher scores on the BRIEF-2 indicate poorer EF. To investigate the relationship between participant's EF and time post-TBI, group-based trajectory modeling (GBTM) was performed.
Results: This analysis included a total of 400 observations across 139 participants with an average of 2.88 observations per participant. The final validated model from GBTM included four unique groups. More robust information about demographics, model selection and validation will be included in the presentation. Group 1 showed levels of EF that were consistently superior EF compared to the standardization sample. Groups 2 and 3 showed levels of EF that were consistently within normal limits though group 3 did show slight improvement in EF over time. Group 4 showed consistently elevated levels of executive dysfunction. Additional variable means from the international classification (ICF) framework were selected and analyzed across each group including: body functions and structures (injury severity), activity and participation (social skills), environmental and personal domains (Caregiver SES, age at injury, free/reduced lunch, IEP/504 plan, enrollment in structured school programming).The presentation will focus on analyzing the differences in these variables across group 1 (i.e., highest levels of EF) and group 4 (i.e., most

elevated levels of executive dysfunction) to discuss individual differences.
Conclusions: Use of GBTM helps identify recovery groups that may not be identifiable through a priori group selection alone. This analytic approach may therefore identify children who are most at-risk for difficulties in later developing cognitive areas like EF. To support rehabilitation and continued development of EFs following TBI, it is essential we are able to direct limited resources to children who need them most. The ICF unites the conceptualization of functioning and disability following TBI and helps guide providers of children with TBI. Use of the ICF framework is valuable to supplement standardized assessments to provide a holistic understanding of academic, social, and health outcomes following pediatric TBI. The analysis from this study supports the use of the ICF framework by demonstrating how a myriad of variables contribute to overall outcomes, particularly when examining EF.

374 Days Since Injury Does Not Affect EEG Features in Adolescents with Concussion

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ABSTRACT

Introduction: Most adolescents experience a major reduction in symptoms and favorable improvements in clinical presentation over the first two-weeks following concussion. Electroencephalography (EEG) detects alterations in brain electrical activity post-concussion and has been shown to differ based on factors such as age and sex; however, it is unknown if EEG features change over time in the subacute period of concussion recovery. Our objective was to determine if EEG features differ in adolescents with concussion based on days between the injury and EEG evaluation.
Methods: This is a secondary analysis of a prospective cohort study. Adolescents with concussion were recruited from the Montreal Children's Hospital Pediatric Emergency Department. Participants completed a resting-state EEG within the first 10 days following their concussion. Resting-state EEG was recorded in eyes-opened and eyes-closed conditions using a dry, 19-channel EEG headset (DSI-24, Wearable Sensing) for 5-minutes per condition. A comprehensive suite of EEG features, including spectral power, permutation entropy, functional connectivity, and graph theory features, were extracted in the delta (1-4Hz), theta (4-8Hz), alpha (8-13Hz), and beta (13-30Hz) frequency bands. A subset (n=10) of EEG features, which are the top features to accurately differentiate between healthy children and children with acute concussion, were evaluated in this study including delta power (F3, F4, F7, F8, & P4 electrodes), alpha power (F7 electrode), and beta power (O1, O2, Pz, & T6 electrodes). Separate linear regression models were conducted with days since concussion as the independent variable and a single EEG feature as the dependant variable. A Bonferroni correction was implemented to reduce the risk of Type I error, setting the significance level to p=0.005.
Results: Thirty-four adolescents (12.9 ± 2.2 years, 20 males) participated. Average time between concussion and EEG assessment was 6.4 ± 2.2 (range-: 2-10) days. Days since injury did not significantly affect any EEG feature in adolescents with concussion. Frontal delta power in the eyes-opened condition came closest to reaching significance (p=0.02), with no other EEG feature obtaining a p-value less than 0.10. Multivariable models were not conducted, as no significant univariate results were observed.
Conclusions: While most children experience major improvements in symptoms and clinical presentation in the subacute recovery period, EEG outcomes remain largely stable over this period of time. Future studies should include healthy controls and longitudinal designs to fully comprehend how concussion affects electrical brain activity beyond the first 10 days after concussion. Understanding if alterations in brain activity ever return to normative levels after concussion and if EEG has potential to guide removal from sport and return to play could greatly improve clinical concussion management in the future.

375 Exploring Interactions Between Traumatic Brain Injury and Alcohol on Inflammation and the Microbiome, An Emergency Department Longitudinal Study

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ABSTRACT

Annually, an estimated 2.8 million individuals in the United States seek care at emergency departments (ED) for traumatic brain injuries (TBI), costing approximately $40 billion. Mild traumatic brain injury (otherwise known as concussion), accounts for 80% of all TBIs. Researchers and clinicians have noted the co-occurrence of TBI and alcohol use, estimated in up to 50% of the cases. When co-occurring, TBI and alcohol present a non-linear aggregated effect that is expected to result

in increased systematic inflammation, an altered gut microbiome, and worse health outcomes (e.g., increased risk for suicide). Indeed, health-based studies on the impact of pre-injury alcohol use on mild TBIs have been mixed, which suggests that other factors may be of importance in terms of distal health outcomes, including biological responses. In this study, longitudinal sampling was conducted from ED patients with post-acute mild TBI. Samples included the fecal microbiome within 48 hours of admission (baseline) and at monthly intervals for up to 12 months in 23 participants for 167 total fecal samples (mean >7 samples per participant). Plasma was collected at baseline for all participants and at 12 months for a subset of 11 participants and analyzed for changes in inflammatory markers (i.e., C-reactive protein, interleukin (IL)-1β, IL-6, CXCL8, tumor necrosis factor). Data regarding psychological histories/symptoms were obtained at baseline and each month of participation. Preliminary analysis was conducted based on results from the Structured Clinical Interview for DSM-5 of current alcohol use disorder (AUD) with 9 positive and 14 negative participants. Overall, we observed a reduction of IL-6 across all participants from initial injury to 12 months. Participants with AUD, as compared to those without, had significantly lower number of unique bacteria (e.g. lower alpha-diversity) and an altered fecal microbial community (e.g., different beta-diversity). Specifically, over the year post injury, alcohol use at the time of injury was one of the most significant predictors of a divergent gut microbiome. While not significant, participants with current AUD had a higher relative abundance of Bacteroides and a lower abundance of anti-inflammatory bacteria Akkermansia and Faecalibacterium. Preliminary analysis of the oral microbiome is on-going oral microbiome with initial results similar to differences observed in the fecal analysis, indicating a potential change in multiple microbial locations. It is expected that findings will contribute to knowledge regarding the biological mechanisms between microbiome post-injury and symptoms of depression and anxiety among those with and without a history of alcohol use.

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376 Optimising Brain Health Post-Traumatic Brain Injury : A Hospital-Based Psycho-Educational Program Promoting Neuroprotective Lifestyles After Severe TBI

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ABSTRACT

Outcome after a traumatic brain injury (TBI) is multi-determined and depends on the interaction of factors, including injury severity, pre-injury (e.g. level of education) and post-injury factors (e.g. access to health care resources including neuro-cognitive rehabilitation, but also environmental factors such as family/socio-economic support, follow-up of comorbidity conditions, physical activity, healthy sleep and diet. . .). Some of post-injury factors are modifiable either as risk or as neuroprotective factors: these factors have an impact on brain health and on post-TBI recovery outcomes. Yet secondary prevention regarding brain health modifiable factors remains insufficient during TBI care management. Because detection and management of risk factors help to prevent neurodegeneration that participate to cognitive decline and clinical dementia, optimizing brain health has gained interest in the neuroscientific community. Multidomain brain health prevention enable indeed protect cerebral reserve and strenghten cognitive reserve that further prevent cognitive decline (FINGER studies, 2021). We describe here the building and assessment of a hospital-based psycho-educational program promoting brain health (i.e., a state of optimal cognitive, sensory, socio-emotional and behavioral functioning, WHO 2022) after a severe TBI. The brain health program takes place during the out-patient rehabilitation. It engages firstly a nurse and a rehabilitation physician doctor. Additional rehabilitation professionals can be included when needed (psychologist, occupational therapist) that educate patients about easy steps towards healthy lifestyles. The implementation includes 1) an interview about lifestyles and daily life environment (social support, physical activity, diet, sleep habits), and clinical check/follow-up of comorbidities distinct from the TBI (cardiometabolic/vascular diseases, epilepsia, mood, addictions, sensory loss); 2) a targeted customized psychoeducation regarding modifiable risk factors. This entails recommendations regarding : cognitive stimulation, Mediterranean diet, physical fitness, secondary prevention of TBI (sport accident, road safety), therapeutic observance for chronic comorbidity conditions, healthy sleep habits, the benefits of social interactions, follow-up of mood disorders, prevention of tabacco/drug/excessive alcohol intake. Assessment of a group of patients stress the need for such an awareness program. The present program builds on successful outcomes of MyBrainRobbie, a French-US-Irish program of our group supported from the Global Brain Health Institute. MyBrainRobbie.org is a public health program (launched in 2019) that promotes brain health among children/teens thanks to videos, educational packs and public health outreach strategies (available in 10 languages, free). Visit: http://www.mybrainrobbie.org.

377 Perceived Cognitive Functioning in Former Elite Rugby League Players with Life Interference Due to Chronic Pain

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ABSTRACT

Rugby league is a collision sport that carries risk for concussions and repetitive head impacts. Some studies of former elite and professional athletes who participated in contact and collision sports reveal higher levels of chronic pain than that of the general population. The purpose of this study was to examine the association between life interference due to chronic pain and perceived cognitive decline in former elite and professional rugby league players from Australia. Former elite-level rugby league players (N=229, Age: [mean] M=52.66, [standard deviation] SD=13.46, Range=29-89) completed the Brief Pain Inventory, the Informant Questionnaire on Cognitive Decline in Elderly (IQCODE, self-report version), and the Depression, Anxiety and Stress Scale (DASS-21). Their median total years of participation playing rugby league was 23 (interquartile range [IQR]=20-27), and their median years of participation at the elite or professional level was 9 (IQR=5-12). Their mean pain interference score was 1.86 (SD=2.26, IQR=0-3.14). There were small significant positive correlations between life interference due to pain and depression (r=.28), anxiety (r=.31), stress (r=.32), and perceived cognitive decline (r=.23). The sample was divided into two groups based on their score on the Brief Pain Inventory (i.e., highest 25% vs. lower 75% of sample). Those in the high pain interference group were significantly more likely than to report a past history of depression (45.5% vs. 23.7%, [odds ratio] OR=2.68, 95% [confidence interval] CI=1.42-5.07) than those in the typical pain interference group. Those in the high pain interference group reported significantly greater symptoms of depression (Hedges' g=0.86), anxiety (g=0.77), and stress (g=0.73), with medium-large effect sizes. They also reported significantly worse perceived cognitive functioning (g=-.051), with a medium effect size. Those in the high pain interference group were significantly more likely than those in the typical pain interference group to be experiencing moderate or greater depression, anxiety, and/or stress (48.1% vs. 23.7%, OR=2.99, 95% CI=1.56-5.72), and they were significantly more likely than those in the typical pain interference group to report cognitive decline, as measured by the IQCODE cutoff score of 3.38 (48.1% vs. 21.0%, OR=3.49, 95% CI=1.81-6.75). Some former elite and professional rugby league players report considerable life interference due to chronic pain. Those with life interference due to chronic pain also experience greater depression, anxiety, and stress, and they are more likely to report a decline in cognitive functioning.

378 Assessing Episodes of Disconnected Consciousness in Emergency Patients: Preliminary Findings

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ABSTRACT

Background: Growing evidence suggests that patients can experience episodes of "disconnected consciousness" (DC; environmental stimulus-independent mental content) during emergency procedures, including near-death experiences (NDEs).

Aims: This project aims to (1) prospectively investigate the prevalence and consequences of DC among patients admitted to the resuscitation room (RR) of our hospital, (2) accurately characterize these DC episodes, and (3) pinpoint their underlying neurobiophysiological processes.

Methods: A total of 201 adult patients who show mild to severe disturbance of consciousness will be included during their RR stay. An audio-visual system will allow for objective environmental control. A wide range of medical parameters will be collected, including partial pressure of carbon dioxide in arterial blood and blood pH. Regional cerebral oxygen levels will be recorded using near-infrared spectroscopy, along with a 6-channel electroencephalogram (EEG). Specifically, EEG data will be divided into time windows and analyzed in the time-frequency domain (using the Continuous Wavelet Transform) and transient changes in brain signal complexity (using Lempel-Ziv Complexity index – LZC) will also be sought. The prevalence and consequences of DC are evaluated through semi-structured interviews (including free narratives, memory tasks, and administration of standardized scales, such as the NDE-Content scale which allows the identification of NDEs using a validated cut-off score) conducted within three days post-admission or awakening (T1), and then at 2 (T2) and 6 months (T3).

Preliminary Results: (1) Out of 29 patients included so far, 23 have survived and 18 have participated in the first interview and 8 in the second interview. Six patients (33%) reported DC episodes. (2) Four of these DC experiences were identified as positive NDEs while two were considered distressing NDEs. One DC was identified at T1 but was not re-identified at T2. Conversely, 2 DC did not meet the sufficient cut-off score at T1 but were identified as DC at T2. (3) We also here present the EEG results for one patient who experienced a negative NDE. We observed increased brain activity in beta and gamma frequency ranges and higher LZC values in two consecutive windows compared to the rest of the recording.

Conclusions: (1) With promising preliminary data, our project aims to identify and study DC episodes in emergency patients. Initially, we expected 10-20% of patients to experience a DC, but our sample shows an incidence of 33%, exceeding expectations. (2) This is the first study to use a prospective longitudinal approach, and our preliminary results suggest that DCs may not be consistently stable over time, challenging current assumptions in the scientific literature. (3) We also hypothesize that transient gamma activity may serve as a neural correlate of DC episode. Ultimately, we aim to increase awareness and understanding of DC within the medical community.

379 Mechanisms of Injury among Canadian Children who sustained Mild Traumatic Brain Injury in Daycare and Preschool Settings

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ABSTRACT

Background: As young children age, a greater number of traumatic brain injuries are sustained outside of the home, frequently occurring in daycare and school settings. Prevention strategies to reduce mild traumatic brain injury (mTBI) primarily target mechanisms of injury, with notable differences in the way injuries occur according to age. Limited epidemiological data exists on mechanisms of injury among children in these settings.

Objectives: To describe the mechanisms of mTBI and details surrounding injury context among children 0-5 years presenting to Canadian Emergency Departments who experienced mTBI in daycare and preschool settings.

Methods: The Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) collects information from patients with injuries who present to 20 emergency departments across Canada. All children 0-5 years old in CHIRPP who experienced unintentional concussion or mild head injury in daycare or preschool locations between 2012-2022 were included in this study. Descriptive statistics were calculated to determine the mechanisms of injury and context details.

Results: Approximately 3063 children aged 0-5 years (Median age at injury= 2 years) old experienced mild traumatic brain injury in daycares and preschools across this ten year span, with the majority of injuries occurring indoors (62%), whilst children were playing (43%). The primary mechanisms of injury were falls (78.5%), being struck/hit by an object (21%), and transport-related (0.6%). Injury surfaces and objects primarily involved floors, concrete surfaces, and tables and most frequently included other children.

Conclusions: In daycares and preschools, falls are clearly the main mechanism of mTBI, with most injuries occurring indoor, during play. These results can inform prevention and knowledge translation programs within these settings.

380 Changes in Plasma Biomarkers of Neurodegeneration and Incident Dementia Risk by TBI Status

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ABSTRACT

Dementia is one remote sequelae of traumatic brain injury (TBI) and given the increased risk associated, TBI is considered a modifiable risk factor of dementia. With the evolving clinical use of plasma biomarkers in both dementia and TBI, there is need to better understand how TBI may influence associations of these biomarkers with dementia risk. This study leveraged data collected from community dwelling participants in the Atherosclerosis Risk in Communities (ARIC) Study. Participants were enrolled in 1987-1989 and were seen for subsequent in-person follow-up visits in 1990-1992 (Visit 2), 1993-1995 (Visit 3), 1996-1998 (Visit 4), 2011-2013 (Visit 5), 2016-2017 (Visit 6), and 2018-2019 (Visit 7). Incident TBI was defined using self-report and ICD-9/10 codes. Dementia was defined from neuropsychological assessments, annual/semi-annual telephone contact, and medical record/death certificate surveillance. Plasma biomarkers (amyloid β [Aβ] 40/42 ratio, phosphorylated tau 181 [p-Tau181], neurofilament light [NfL], glial fibrillary acidic protein [GFAP]) were measured on Quanterix Simoa platform in a subset of samples collected at Visit 3, Visit 5, and Visits 6/7. Covariate-adjusted Cox proportional hazards models were used to determine whether occurrence, severity, and number of TBIs modified associations of biomarkers with incident dementia. We assessed for interaction on the additive scale (i.e. sum of individual risks) using Relative Excess Risk due to Interaction (RERI) and on the multiplicative scale by including the product of each biomarker with TBI in the statistical model (i.e. synergism between TBI and biomarker levels resulted in integrated risk which is larger than the product of individual risks). We included 1,047 individuals without prevalent dementia at Visit 5 in the analyses. Mean (SD) age was 76.6 (5.3) years, 65.9% were female, 28.9% were self-reported Black race, and 13.4% had incident TBI. Hazard ratios for associations of each plasma biomarker with incident dementia by incident TBI status were examined. We found evidence of a non-multiplicative, positive additive interaction by incident TBI status in associations of late-life (Visit 5) $\log_2$NfL with incident dementia (RERI p=0.02), but no evidence of interactions in midlife for any biomarker. We found both multiplicative and additive interactions by TBI frequency in associations

of midlife Aβ42/Aβ40 ratio and late-life log_2p-Tau181 and log_2NfL with incident dementia. We also observed evidence for multiplicative and additive interactions by TBI severity in associations of midlife Aβ42/Aβ40 ratio and the change per decade between midlife and late-life in log_2GFAP with dementia risk. This study provides evidence that TBI events modify the associations of midlife and late-life plasma biomarkers with dementia risk. Importantly, we observed evidence for interaction by TBI status for associations of AD-related biomarkers as well as for biomarkers of neuronal injury and astrogliosis, suggesting that the pathologic processes underlying TBI-related dementia are heterogeneous and that these associations may be bi-directional.

381 Repetitive Mild Traumatic Brain Injury and Signs of Accelerated Neurocognitive Aging in Young Adults

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ABSTRACT

Background: There is an established link between repetitive mild traumatic brain injury (mTBI) and risk of neurodegenerative disease (e.g., dementia) in older adulthood. Data from our lab suggest that young adults with repetitive mTBI recruit compensatory neural resources to support behavioral performance, which – importantly – is also observed in aging. Because aging is the strongest risk factor for dementia, we theorized that neural mechanisms, like compensatory recruitment, are triggered by repetitive mTBI and reflect accelerated neurocognitive aging and may underlie risk for neurodegenerative disease. To continue testing this theory, we developed a protocol to elicit additional neural mechanisms linked to aging. Specifically, we predicted that young adults with repetitive mTBI would show signs of Hemispheric Asymmetry Reduction in Older Adults (HAROLD). This model states that older adults recruit bilateral prefrontal cortices (PFC) to support task performance while young adults leverage unilateral recruitment. Thus, we expected that young adults with repetitive mTBI, compared to never-injured controls, would require bilateral PFC recruitment to support equivalent motor task performance.

Methods: Our protocol includes a lower extremity (LE) and upper extremity (UE) subtask and is administered with simultaneous, portable functional near infrared spectroscopy (fNIRS). Each subtask has single motor and dual tasks; here, we will describe single motor tasks. Tasks include overground walking (LE) and throwing/catching a ball (UE), which generates gait speed and number of catches. FNIRS optodes measure from bilateral motor cortices, due to task demands, and bilateral PFC for hypothesis testing. Standardized fNIRS preprocessing steps are completed with raw data.

Results: As data collection is ongoing, we completed an interim analysis from 9 young adults with mTBI (Mean Age= 20.75; 3 males) and 6 never-injured controls (Mean Age= 20.71; 2 males) using between-subject t-tests for behavioral outcomes, within-subject contrasts (single motor vs. rest) to quantify task-dependent PFC activity, and between-group contrasts to compare bilateral PFC activity. As predicted, groups had equivalent motor performance in gait speed ($p= .622$) and catches ($p= .634$). However, within-subject contrasts revealed differences aligning with HAROLD-related hypotheses. Control participants had significant task-dependent activity in right PFC during both LE ($p< .001$) and UE ($p< .001$) single motor tasks, but not in left PFC (p values> .05). In contrast, mTBI participants had significant task-dependent activity in both right PFC and left PFC during LE and UE single motor tasks (all p values< .001). Between-subject analyses confirmed that the mTBI group had bilateral PFC activation, as the mTBI group had significantly more left PFC activity than controls (who had no significant activity) during both LE ($p< .001$, $\mu2= .996$) and UE ($p< .001$, $\mu2= .997$) single motor tasks.

Methods: Our hypotheses were confirmed and may provide additional evidence of accelerated neurocognitive aging in young adults with repetitive mTBI.

382 Formalized Approach to Environmental Management for the Agitated Patient in the Brain Injury Neurorehabilitation Setting

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ABSTRACT

Objective: This quality improvement project aimed to enhance staff understanding and application of low stimulation protocols (e.g., OLD and NEW) for managing agitation in patients with post-traumatic amnesia (PTA) following traumatic brain injury.

Setting/Participants: The study was conducted in a 25-bed neurorehabilitation unit at a university hospital, involving interdisciplinary staff.

Methods: Over a 16-month period, clinical staff received comprehensive training on the NEW "Stop Light" protocol through various modalities, including expanded onboarding for new employees, quarterly Elevate Your Expertise (EYE) sessions, behavioral skills days, and weekly nursing safety meetings. The new protocol replaced an outdated low stimulation protocol that consisted of a one-page sign with bullet-point suggestions and staff training provided via a single onboarding session. Pre- and post-training surveys assessed staff confidence, frequency, and perceived effectiveness with use of the OLD versus NEW low stimulation protocol. Data were analyzed using descriptive statistics and Fisher's exact tests.

Results: A total of 124 survey responses (n = 67 and 57 from OLD and NEW low stimulation protocol users, respectively) were included in the analysis. RN/Nurse consisted of the largest proportion in the survey responses (n = 43 or 34.7%), followed by health care assistant (n = 23 or 18.5%), physical therapist (n = 20 or 16.1%), and occupational therapist (n = 17 or 13.7%). Type of low stimulation protocol was significantly associated with effectively managing patients with agitated behaviors of impulsive (p = 0.002). Post-hoc analysis revealed that 81.4% of the NEW low stimulation protocol users rated "most of the time" or "always" for how effective the low stimulation protocol was, compared with 47.1% for the OLD low stimulation protocol users (p = 0.003). Similarly, the NEW low stimulation protocol was significantly associated with more effectively managing patients with agitated behaviors of restless, with 88.4% rating "most of the time" or "always" versus 47.1% for the OLD low stimulation protocol (p < 0.001). There was no significant difference in confidence level in understanding, correctly using, or educating the family on the low stimulation protocol between the OLD and NEW low stimulation protocol users (p > 0.05). Likewise, no significant, between-protocol difference was observed in whether to review with a co-worker about any questions on the protocol, to easily locate the protocol in patient orders, or to easily locate information about the protocol, as well as how frequently to provide/receive education at shift change to/from the replacement about the assigned low stimulation patient (p > 0.05).
Conclusions: The NEW low stimulation protocol was shown to be more effective than the OLD protocol in managing patients with some types of agitated behaviors, including impulsive and restless. Future efforts will target areas for increased staff confidence with utilization and implementation of the NEW protocol.

383 how Clinicians Can Get the Best Bang for Their Buck When Measuring Patient Progress and Impact of a 12-Week Group-Based Physical Activity Rehabilitation Intervention Post Chronic Mild TBI

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ABSTRACT

Background: A Montreal-based interdisciplinary rehabilitation traumatic brain injury (TBI) program developed a 12-week group-based physical activity intervention (120 minutes per week) for adults having difficulties resuming daily physical activities (3 to 18 months post injury) while managing their symptoms (headache, sensitivity to light, dizziness). Using an approach based on motivational interviewing and educational capsules, the program aimed to improve participants' general physical condition by helping each participant identify a meaningful physical activity (PA) and learn to gradually increase the amount of this activity to tolerable symptoms. The kinesiologists and physiotherapists established a standardized evaluation procedure to help identify the most appropriate measures for assessing progress and intervention impact.
Objectives: to determine whether measuring patient progress was feasible and whether the chosen tools could detect functional change.
Methods: Program members selected four reliable and valid clinical tools with minimal administrative burden to assess functional endurance (6 minute Walk Test -6MWT: minimal clinically important difference (MCID) = 54-80 meters), muscle endurance (Arm curl test and Sit to Stand Test-StoS MCID=2 reps), and fear of movement or re-injury (Tampa Scale for Kinesiophobia – TSK) and collected data for each measure for 73 consecutively admitted participants over a 4-year period. Data were analyzed pre- and post-intervention using paired t-tests (p < 0.05).
Results: Tests were often difficult to administer routinely due to time and human resource constraints, COVID-19, and uncompleted questionnaires. For example, no data could be obtained from 22 participants (30%) due to COVID-19 and program dropouts; partial data were obtained for 51 participants. Seven (9.5 %) participants performed the Arm curl test, and this measure was later abandoned due to lack of pertinence. Pre and post measurement data were obtained for 14 participants for the remaining 3 tools and 27 participants had data for 2 tools (StoS and 6MWT). The results showed significant improvements across all 3 measures despite small sample sizes. In the 6MWT, participants' distances increased on average by 42 m (n=27; p=0.003), while the number of repetitions in the StoS test also rose on average by 3.11 repetitions (p = <0.001). Additionally, there was a reduction in kinesiophobia, indicated by lower TSK scores (n=14, p = 0.017). Despite the overall positive outcomes, 4 participants did not show improvement in the 6MWT, 4 in the StoS test, and 3 in the TSK.
Conclusions: Although the results are limited to one sample, this exercise allowed clinicians to reevaluate and optimize their intervention and to select appropriate tools adapted to their clinical setting allowing them to continue to monitor participant progress. These findings also highlight the variability in individual responses to the PA intervention, suggesting the continued need for individually tailored approaches for all.

384 Examining Associations Between Football Exposures and Neuropsychological Functioning in Former Professional Football Players

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ABSTRACT

There is considerable interest in understanding later in life brain health in former professional football players. Cognitive functioning is a measurable marker of brain health. The purpose of this study is to examine associations between football exposures, such as years of participation and concussion signs and symptoms during playing years, and neuropsychological functioning in former professional American-style football players. Participants were 98 former professional football players who underwent neuropsychological testing for research purposes. Their median age was 48 (interquartile range=41-55). There were 51 (52%) who identified as Black or African American and 47 (48%) who identified as White. The battery included (i) six memory test scores from the Neuropsychological Assessment Battery (NAB, derived from List Learning, Story Learning, and Daily Living Memory), (ii) the NAB Naming Test, (iii) the raw copy score from the Rey Complex Figure, (iv) five test scores from the Delis-Kaplan Executive Function System (derived from Verbal Fluency and Color Word Interference), (v) the Test of Premorbid Functioning Reading Standard Score, and (vi) the Reynolds Intellectual Screening Test. Specific football exposure variables included total years of participation, years of professional play, age of first exposure to football, and concussion signs and symptoms during playing years. There were 21 individual test scores that were correlated with four football exposure variables. We defined a negligible correlation, having no practical or clinical significance, as a correlation of r=0.20 or lower, meaning that the two variables had 4% or less overlapping variance. More than 95% of the correlations were negligible. There were a few very small negative correlations between concussion signs and symptoms during playing years, memory test scores, and the category verbal fluency score. There were no small meaningful correlations between any neuropsychological test score and age of first exposure to football, years of professional play, or total years of exposure to football. In this sample of former professional football players, age of first exposure to football and years of exposure to football were not associated with any neuropsychological test score. Retrospective ratings of concussion signs and symptoms during players years had a negligible to small association with neuropsychological test scores.

385 A Sham-Controlled Trial of Vagus Nerve Stimulation for ICU Patients with Severe Brain Injuries

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ABSTRACT

Background: In the absence of early signs of consciousness recovery, withdrawal of life-sustaining therapy accounts for the majority of deaths in ICU patients with disorders of consciousness (DoC). Among neuromodulation techniques, trans-auricular vagus nerve stimulation (taVNS) offers a promising non-invasive approach that may help to restore consciousness in patients with severe brain injuries by promoting bottom-up cerebral reafferentation.

Methods: This randomized, double-blind, sham-controlled trial prospectively enrolled 44 ICU patients diagnosed with unresponsive wakefulness syndrome (UWS) or minimally conscious state (MCS) in the early phase following brain injury. Patients were randomly assigned to receive either active 3mA taVNS or sham stimulation, in a 1:1 ratio, for 45 minutes a day over 5 consecutive days. Behavioral assessments using the Coma Recovery Scale-Revised (CRS-R – primary outcome measure) and neurophysiological measures from high-density electroencephalography were performed at baseline and after the fifth day of treatment. Patients' functional recovery was further assessed at three months post-intervention. The study was conducted in adherence to the published protocol.

Results: Forty-four patients with DoC were randomized into the study (20 females; 23 MCS; 9 TBI; median age: 59 years; median time since injury: 21 days). Baseline characteristics did not significantly differ between the groups. The one-week taVNS protocol was well tolerated, with 91% of patients completing all sessions and no taVNS-related serious adverse event observed. After one week of intervention, the active taVNS

group (n=22) demonstrated significantly greater improvements in CRS-R total score compared to the sham group (n=22) (W=277.5; p=0.032). Intra-group analyses also revealed a significant post-treatment evolution in the active group compared to baseline (median pre-treatment=8 [IQR 5.75]; median post-treatment=11 [IQR 12]; V=7; p=0.002), while the sham group did not display any significant change (median pre-treatment=5 [IQR 5.25]; median post-treatment=6 [IQR 4]; V=20; p=0.264). Furthermore, a greater number of patients from the taVNS group (n=12) compared to the sham group (n=4) exhibited a clinically meaningful recovery following the intervention, with the emergence of at least one new sign of consciousness that was never observed before ($\chi 2$=4.014; p=0.045). Neurophysiological markers and long-term outcomes are currently under investigation and will be reported in future analyses.
Conclusions: This is the first therapeutic randomized controlled clinical trial conducted in patients with DoC while in the ICU. Our findings indicate that vagus-mediated neuromodulation is a safe and effective intervention that promotes early recovery of consciousness in critically brain-injured patients in acute care, despite the challenging setting. These results provide a foundation for future research to explore the longer-term benefits of taVNS and its role in treating patients with disorders of consciousness. Clinical Trial Registration n° NCT04065386.

386 The Psychosocial Functioning & Microstructural Brain Changes of Children And Young People With Long COVID: A Case-Control Study

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ABSTRACT

Objective: To compare the psychosocial functioning of children and young people (CYP) with long COVID and associated microstructural brain changes with those without history of COVID.
Methods: This case-control study involved 180 participants between 6 and 24 years old. Participants had MR-Diffusional Kurtosis Imaging (DKI) of the brain. Participants and their parents were invited to complete a survey on emotional & behavioral difficulties, quality of life and level of psychological distress. Univariate ANOVA was conducted to compare the psychosocial functioning and the brain microstructures of participants with long COVID and the control subjects. Multiple regression analyses were conducted to explore the relationships between the brain microstructural changes and the wellbeing among the subjects with long COVID. Regions showing significant differences between cases and controls were selected for the analyses.
Results: Compared to the controls, participants with long COVID had more behavioral and emotional difficulties (F = 9.23, Pcorr = 0.006), with more emotional problems, hyperactivity issues and peer problems. Their overall quality of life was poorer (F = 14.2, Pcorr < 0.001), with worse physical, social, and school functioning. CYP with COVID also reported more psychological distress (F = 5.92, Pcorr = 0.05). Regression analyses on a stratified sample of school-aged children (6 - 11 years) revealed that increased MK values in left dorsolateral superior frontal gyrus were associated with less peer problems (estimate = -26.73, p = 0.047), and increased MK values in left superior frontal gyrus, medial were related to less peer problems (estimate = -26.13, p = 0.034). Among the adolescents aged 12 to 17, increased MK values in the right cingulate gyurs, posterior part were associated with less emotional problems (estimate = -10.90, p = 0.049), and increased FA values in white matter right uncinate fasciculus was related to better prosocial behavior (estimate = 17.22, p = 0.015).
Conclusions: The psychological functioning of children and adolescents with long COVID were impaired. Besides their physical recovery, clinicians should also monitor their mental wellbeing.
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387 A Study Protocol For A Randomized Controlled Trial On The Use Of Virtual Reality For Cognitive Rehabilitation In Patients With Severe Acquired Brain Injury

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ABSTRACT

Background: After a severe Acquired Brain Injury (sABI), individuals might experience mild-to-severe cognitive impairments. In these patients, cognitive rehabilitation is provided as early as possible, taking advantage and guiding brain plasticity. According to a restorative approach, Traditional Cognitive Training (TCT) usually involves repeated paper-and-pencil exercises of increasing difficulty and targeting specific cognitive domains. Recently, some evidence supported the use of Virtual Reality (VR) for ABI rehabilitation, particularly focusing on stroke cases. The advantages of VR for ABI rehabilitation encompass enhanced ecological validity, assessment and treatment standardization, and the ability to control task complexity. Nonetheless, there is limited evidence in severe ABI patients (sABI) and in different etiologies. The present multicenter randomized controlled trial (ID: NCT06474871) aims at

exploring the effectiveness, in terms of clinical-functional, neurophysiological, and biomarkers changes, of a cognitive rehabilitation focused on executive functions performed by a non-immersive VR device, compared to TCT, in a cohort of patients with sABI.
Methods: According to an a priori power analysis, 28 adult patients with sABI will be enrolled by 5 Italian neurorehabilitation units and will be randomly assigned to receive either 30 minutes of VR or TCT sessions at the same time each day throughout the trial. At study entry (T0), patients will undergo clinical-functional evaluation, neurophysiological assessments, and serum blood sampling. Thereafter, VR or TCT will be provided daily, five times per week, for 5 weeks (25 total treatment sessions). Further clinical-functional and neurophysiological assessments will be performed at the end of the treatment (T1). A follow-up evaluation will be performed after 1 month from T1 (T2). Statistical analyses will be conducted blind, according to the intention-to-treat principle.
Outcomes and Measures: Primary outcome: Trail Making Test for evaluating executive functions. Secondary outcomes: Disability Rating Scale and modified Barthel Index for evaluating functional disability, System Usability Scale for VR device usability. Exploratory outcomes: Neuropsychiatric Inventory for evaluating behavioural disorders, Levels of Cognitive Functioning, Galveston Orientation and Amnesia Test, and Oxford Cognitive Screening for global cognitive functioning, qualitative and quantitative measures extracted from a 30-min EEG at rest as neurophysiological indices of brain functionality, and levels of serum biomarkers for brain plasticity. This work was supported by the Italian Ministry of Research, under the complementary actions to the NRRP "Fit4MedRob - Fit for Medical Robotics" Grant # PNC0000007).
Conclusions: Data collection will start in November 2024. The preliminary data will be analyzed and presented at the Congress. This trial will provide new insights into the effectiveness of VR in sABI cognitive rehabilitation.

388 What is the Impact of a Pain Management Group for People with Neurological Conditions and Persistent Pain? – A Pilot Study

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ABSTRACT

Purpose: People living with neurological disorders including brain injury have high rates of persistent pain. This mixed methods pilot study was designed to explore the impact on psychological and functional outcomes of a nine-week Pain Management Group (PMG) for clients with both a neurological diagnosis and persistent pain.
Methods: A pre- and post-test design was used. Measures of subjective pain intensity (Numeric Rating Scale of Pain), quality of life (Rand SF-36), pain catastrophizing (Pain Catastrophizing Scale), pain acceptance (Chronic Pain Acceptance Questionnaire) and occupational goal performance (Canadian Occupational Performance Measure) were completed at three time points: Time 1 (pre-treatment), Time 2 (end of treatment), and Time 3 (follow up 3 months after treatment). A qualitative exit interview was done at Time 2. 53 participants with neurological disorders including brain injury, spinal cord injury and multiple sclerosis were recruited and 44 provided at least partial data at all 3 time points.
Analysis: To assess the primary objective of change in scores at Times 1 and 2, paired t-tests were performed for continuous variables and Signed rank texts for discrete variables. Exploratory repeated measures analyses were performed to assess if there were any differences between groups defined by sex, diagnosis type, age, and number of treatment sessions attended at all 3 time points. Measures were also compared to reported pain scale at each time point using Spearman ranked correlations. Constant comparative analysis was conducted on qualitative data and themes were developed.
Findings: Statistically significant positive changes were found between T1 and T2 on measures of pain catastrophizing (mean change: 6.7 (9.3); p=0.0004), acceptance of pain (mean change: -9.0 (12.6); p=0.0003), health-related quality of life (mean change: 8.2 (14.1); p<0.0001), goal performance (mean change: -3.4 (2.0); p<0.0001) and goal satisfaction (mean change: -4.5 (2.1); p=0.0022). Gains were maintained to Time 3. The qualitative analysis offered themes around the importance of peer dynamics, strengths and challenges with the group format, and experiences with applying group content to daily
Discussion and Conclusions: Results support that the PMG shows potential as a beneficial persistent pain treatment for improving psychological status, functional abilities, and health-related quality of life in persons with neurological diagnoses.

390 Multimodal Mapping of Language Network Integrity Predicts 6-month Recovery After Severe Traumatic Brain Injury

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ABSTRACT

Detecting language function is a fundamentally important milestone in patients with severe brain injuries, as it represents the reintegration of cognitive processing and predicts ongoing recovery of functional independence. Yet, language processing can be difficult to accurately measure and can go unrecognized in many patients, particularly during the acute stage of recovery from severe brain injury in the intensive care unit (ICU). Moreover, there is a growing body of literature demonstrating that covert language function – detected using fMRI or EEG – may be diagnostically and prognostically useful in this patient population. To this end, we performed a series of multimodal, longitudinal investigations in 33 patients with acute severe TBI that integrated results from language resting-state functional MRI, stimulus-based fMRI that was examined hierarchically, diffusion tractography of language pathways, and behavioral assessments to 1) identify biomarkers of recovery; 2) parcellate lower- and higher-level language processing; and 3) assess longitudinal changes in language function that track with recovery. Regression modelling indicated that language network rs-fMRI and DTI outperformed stimulus-based fMRI for predicting recovery. These markers predicted functional recovery at 6 months with 87.5% accuracy and outperformed behavioural assessments, as well as clinical and demographic predictors in the ICU ($p<0.001$). Through a hierarchical ROI analysis, we parcellated lower-level language processing from high-level function in stimulus-based fMRI responses and found that all but one patient with covert awareness had neural activity in language ROIs implicated in higher-level language processing, suggesting that language stimuli-based paradigms may be sensitive for identifying higher-order language comprehension. At 6 months post injury, rs-fMRI and stimulus fMRI were indistinguishable from healthy controls, suggesting that functional neural markers of language processing were largely restored. Collectively, these results indicate that language biomarkers have prognostic potential in the ICU, index recovery of consciousness more so than other networks, and may provide more accurate tools for identifying covert cognitive processing and functional recovery after severe TBI.

391 Reading after Concussion: A Case Series of Children Receiving Neuropsychological Testing

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ABSTRACT

Background: Fluent reading crystallizes across the early school-age years. Reading is based in language, particularly phonological processing, but also relies on cognitive and visual systems that are susceptible to the effects of mild traumatic brain injury (mTBI). For example, cognition underlies activities such as remembering and linking information, monitoring of comprehension, and deciding when and what strategies might be needed. Oculomotor function allows the eyes to move fluidly across lines of text and down a page. Reading comprehension is critical toward academic success, and increasingly, reading is a key form of communication through social media, texting, and emails. Unfortunately, reading has been understudied in children and is often overlooked in clinical care and rehabilitation for mTBI. To inform future research and clinical care, the purpose of the current case series study was to examine whether children receiving neuropsychological testing following concussion might be at risk for reading problems. Methods: In this retrospective chart review, we extracted data from outpatient neuropsychological reports. In this clinic, a measure of reading comprehension was included in all pediatric assessment batteries. Chart inclusion criteria were: age between 5 and 18, diagnosis of mTBI, complete Woodcock-Johnson Passage Comprehension scores. Because we chose a case series design, no other exclusion criteria were applied. Two trained research assistants extracted data. A third trained research assistant reviewed extraction and resolved any inconsistencies through discussion and document review. Results: Eight charts met inclusion criteria. Children's ages ranged from 6;11 to 16;2 at the time of assessment. Time post injury similarly ranged widely from one week to 2.8 years. All spoke English as their dominant language, seven were White and non-Hispanic (the other declined to respond), and five were male. Most had a complicating pre-morbid learning condition, of which Attention Deficit/Hyperactivity Disorder was most common. Only two students had Passage Comprehension standard scores above 85: an 11;1 male (SS=99) and a 16;2 female (SS=92). Three children scored at or below one standard deviation (SD) below the mean (85, 81, 79), one 1.5 SD below (74), and two scored more than two SDs below the mean (68, 55). Discussion: Children with a history of mTBI seeking neuropsychological testing may benefit from screening for reading problems. While the current design and sample size did not allow for pooling of data or examination of contributing factors, reading problems may be common in those seeking this type of characterization of strengths and weaknesses, whether from developmental or acquired conditions. Given the impact that reading impairments can have on learning and communication, future work should examine a broader sample of children with mTBI to be able to understand factors that might be contributing to difficulty reading, as well as those conducive to rehabilitative approaches.

392 Experiences of University Students with Concussion in a Peer Mentoring Program: A Mixed Methods Analysis of the SUCCESS Program

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ABSTRACT

Background: Given the fast-paced and high-stakes learning environment of university settings, students with concussion are at particular risk for negative academic as well as psychosocial consequences. Concussions are more common in non-student athletes than athletes, which means that most students will not be connected to systems of care for identification, diagnosis, treatment, and other management approaches. Instead, students must often self-advocate and navigate these systems independently during their recovery. In this study, students with recent concussions and persistent symptomatology received mentoring from students who had previously sustained concussions and successfully returned to school as university students. Here, we evaluated the emotional valence of student descriptions of experiences participating in the peer mentoring program.

Methods: Eight mentees with concussion completed the Success in University and College after Concussion with Effective Student Supports (SUCCESS) program followed by a semi-structured exit interview. Students averaged 21.9 years in age and 4.1 months post injury (range 1 to 7 months). Three identified as male, five as female. Five students were White, two Asian, and one Black. Injury mechanism included sports, struck by/against, and motor vehicle crash. Interview questions addressed concussion and recovery experiences, along with reactions and feedback around mentoring. Probes were either neutral, or for both positive and negative exemplars. Interviews were transcribed, then coded using thematic analysis. Themes were subjected to sentiment analysis using NVivo version 14 to identify positive and negative statements, and a chi-square test was applied to compare distributions of frequency counts across categories.

Results: From thematic analysis, six themes emerged, specifically: Academic Performance and Load, Accommodations and Adjustments, Changes in Function and Daily Living, Uncertain Concussion Knowledge, Interest In and Impacts of Peer Mentoring, and Recovery and Rehabilitation. There was a non-significant trend toward Accommodations and Adjustments, Interest In and Impacts of Peer Mentoring, and Recovery and Rehabilitation being more positive than the other themes ($X2$ (5, N = 196) = 10.68, p = .058). Instead, experiences were mixed across themes, with both positive and negative statements.

Discussion: Experiences following concussion as a university student are expressed both positively and negatively, reflecting both the difficulty of the concussion effects and its academic and broader impacts, as well as the influence of positive supports and accommodations on symptom resolution and re-integration into student life. Even though student mentees in the current study had completed the intervention, re-entered school, and described symptoms as resolving, they appeared to continue to process both positive and negative aspects of their experience. Future work should further examine whether such sentiment measures are sensitive to change over time following concussion, how prompts impact elicitation of sentiment, and if emotional valence of linguistic output may be useful as a measure of response to intervention following concussion.

393 Beyond the Protocols: Defining Participation in Children with Prolonged Disorders of Consciousness

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ABSTRACT

Brain injury is a leading cause of child death and disability worldwide, with reports of three million children experiencing traumatic brain injury (TBI) annually (Dewan 2016) and millions more affected by other forms of acquired brain injury. Of these children, a subset experiences such severe injuries that arousal and awareness are affected, resulting in disorders of consciousness (DoC). While many children emerge from this state and demonstrate functional improvements, some children remain in a persistent state of unresponsive wakefulness or minimal consciousness. The 2018 practice guidelines on DoC counsel practitioners that "once a prognosis has been established that indicates a likelihood of severe long-term disability, clinicians must counsel family members to seek assistance in establishing goals of care" and that "clinicians must identify patient and family preference early and throughout provision of care to help guide the decision-making process for persons with prolonged DoC" (Giacino 2018). However, these conversations may not occur following the acute phase of injury.

This abstract (linked to submissions Conklin and Diliberto) introduces the idea of expanding the concept of "goals of care" and "decision-making process" beyond initial discussions of withdrawal of care and discharge disposition towards a focus on participation for individuals with DoC. This abstract will introduce the construct of participation and discuss existing literature in children following severe brain injury and adults with DoC.

The World Health Organization's International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) defines participation as 'involvement in a life situation' (WHO 2001). Researchers have further specified participation as "attendance in activities and involvement while attending those activities" (Imms 2017), while others focus on the concept of engagement (Imms 2016). Imms defined Engagement as an "internal state, often described as having several components: cognitive, behavioral, and emotional."

A scoping review of children with severe brain injury discussed the multiple challenges of reintegrating and engaging in meaningful participation, "with potentially detrimental effects on health and wellbeing" (Wales 2021). Camara-Costa found that seven years after severe TBI, participation restrictions in children were associated with severity of initial injury. Additionally, while there is no existing research on participation in children with DoC, a 2019 study in adults found that persons with severe TBI initially in a DoC state were "unlikely

to participate in productive tasks, social endeavors, or activities outside of the home up to 5 years post-injury, even if functional independence was recovered" (Malone 2019).
With the knowledge of the challenges of fostering participation following severe brain injury, we ask the question - What does participation, involvement, or engagement look like in patients without or with limited external indications of cognitive, behavioral, or emotional outputs (submission Conklin)? How can we assess our success in fostering it (submission Diliberto)?

394 Beyond Recovery: The Long-Term Realities of Acquired Brain Injury

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ABSTRACT

Introduction: Brain Injury is a chronic condition where recovery and support needs are lifelong. Historically, the care system has focussed on ensuring persons get the required acute care after brain injury. This focus leaves many persons with lived experience (PWLE) and their families left to find needed supports on their own, often discovering that supports do not exist or are inaccessible. To date, there has been poor characterization of PWLE in the decades following injury.
Methods: The Ontario Brain Injury Association (OBIA) conducts a comprehensive longitudinal electronic survey to examine the long-term effects of acquired brain injury (ABI) on persons across the province of Ontario (Canada). The survey was originated more than 30 years ago and revised in 2020 to ensure relevance to the experience of PWLE. OBIA recruits persons through membership in local brain injury associations, brain injury public service providers, social media, association websites and public communications. Once enrolled in the study, participants complete the survey yearly.
Results: To date, 1,576 participants (1026 (65.1%) female, with a mean age of 50.8 (SD 14.3) have completed the revised survey. This diverse group, representing various ethnic and economic backgrounds and mechanisms of injury (MOI; motor vehicle collision (697 (44.3%), falls (496 (31.4%), sporting related (315 (20.0%), bike-related (142 (9.0%), assault (189 (20.0%), neurological illness (246 (15.6%), anoxia (72 (4.6%), other (589 (37.4%) from all regions of Ontario, provides a unique dataset to better understand the ongoing challenges faced by individuals post-injury. With an average duration of 20.3 (SD 17.4) years since injury, the findings reveal enduring impacts on mental health (85.7% with depression and 85.8% with anxiety post-injury, and approximately 80% requiring mental health treatment), activities of daily living, employment, and overall quality of life with work and social activities the most affected by their current symptoms. Symptoms such as headache, fatigue, and perceived memory and attention impairments were endorsed by more than 80% of participants with no effect of time since injury on endorsement (p-values ranged from 0.1 – 0.9). Participants with lower income were between 8% and 42% less likely to access fee-for-service (e.g. neuropsychology, psychological therapy, occupational therapy, outpatient rehabilitation, etc.) and single-payer health services (neurology, physiatry, etc.). Participants involved in litigation resulting from their brain injury, regardless of MOI, accessed services more (15 – 67%) than those without litigation involved despite having similar symptom burden and no sex differences.
Conclusions: Survey findings create a picture of ongoing unmet needs, underscoring critical need for comprehensive long-term medical and community support systems to address the ongoing challenges faced by individuals with brain injuries. This research will inform policy and practice, ultimately enhancing the care pathway and optimizing recovery for individuals living with the long-term consequences of brain injury.

395 Prevalence of Mental Fatigue Versus Physical Fatigue Across Four Different Neurological Brain Disorders

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ABSTRACT

Objectives: Fatigue is a frequently reported complaint by patients with neurological brain disorders and can be profoundly disabling. Fatigue concerns a subjective experience that often originates from multiple factors and a distinction can be made between physical fatigue and mental fatigue. Especially for patients with brain injury, it has been suggested that mental fatigue (e.g. experiencing a reduced capacity to perform mental activities) plays an important role. So far, fatigue has often been investigated as a general concept, including both mental fatigue and physical fatigue, for which elevated levels of fatigue have been reported in almost all neurological populations, including traumatic brain injury (TBI), subarachnoid haemorrhage (SAH), low-grade gliomas (LGG) and multiple scleroses (MS). However, to date, it is not clear to which extent this concerns physical fatigue or mental fatigue. The present study aims to investigate the prevalence of mental fatigue versus physical fatigue across different neurological brain disorders.
Methods: Data were obtained from observational studies and clinical records from the University Medical Center Groningen, the Netherlands. We included 45 patients with mild TBI, 25 patients with moderate-severe TBI, 54 patients

with SAH, 35 patients with LGG and 61 patients with MS. Mental fatigue and physical fatigue were measured with the Dutch Multifactor Fatigue Scale.
Results: High levels of mental fatigue were reported by 78% of patients for mild TBI, 60% for moderate-severe TBI, 57% for SAH, 17% for LGG and 69% for MS. High levels of physical fatigue were reported by 56% of patients for mild TBI, 36% for moderate-severe TBI, 33% for SAH, 6% for LGG and 48% for MS. When considering the overlap between mental fatigue and physical fatigue, we found that from the patients who reported severe mental fatigue, 63% of patients also reported severe physical fatigue for mild TBI, 53% for moderate-severe TBI, 52% for SAH, 0% for LGG and 64% for MS.
Conclusions: Severe mental fatigue was reported by high percentages of patients with neurological brain disorders. Interestingly, for all groups, a larger proportion of patients reported severe mental fatigue compared to physical fatigue.

396 Purpose Renewal after Brain Injury: Results of a Feasibility Study

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ABSTRACT

Purpose: Persisting symptoms following a concussion can result in cascading negative consequences that impact a person's ability to resume pre-injury activities and life roles. These significant life changes can place individuals with post-concussion syndrome at risk for a disrupted sense of purpose in life. Addressing purpose disruption is an important goal of person-centered rehabilitation, since living with a sense of purpose in life is associated with a number of benefits to wellbeing and is considered a modifiable health risk factor. The current study examines the feasibility and preliminary efficacy of a purpose renewal intervention for adults with post-concussion syndrome who endorse a sense of purpose disruption in the aftermath of their injuries.
Methods: Participants with persisting symptoms of concussion completed the Compass Course (CC), a twelve-week group-based purpose renewal intervention. Participants completed a battery of pre- and post-intervention measures that assessed concussion symptomatology, sense of purpose in daily life, and life engagement. Following the conclusion of the intervention, participants completed experience surveys and participated in a focus group.
Results: Thirty-seven participants enrolled in the study, and twenty-two participants fully completed the CC intervention. Participants who completed the intervention were significantly different from those who withdrew on age and work status, but not on other measured characteristics (e.g. other demographic factors, severity of concussion symptoms, degree of functional impairment). Participants who completed the intervention ("completers") were one year post-concussion, on average, with scores on a measure of concussion symptomatology suggestive of significant limitations in ability, adjustment, and participation in daily activity. Nearly all (21 out of 22) completers reported that the CC intervention was acceptable, with high ratings for the intervention's helpfulness and high ratings for overall satisfaction. Completers demonstrated statistically significant pre-post intervention change across all outcome measures (sense of purpose in daily life, life engagement), with maintenance of this positive change at two-month follow up. Qualitative data from the post-intervention focus groups suggest that purpose renewal intervention is of strong interest in this population, but that the CC would benefit from modifications to increase its acceptability and efficacy for adults with persisting symptoms of concussion.
Conclusion: The CC is a promising and novel intervention for addressing purpose disruption after brain injury. Future work will adapt aspects of the CC to better align with the needs of adults with persisting symptoms of concussion.

397 Beyond the Protocols: Assessing Participation in Children with Prolonged Disorders of Consciousness

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ABSTRACT

This abstract will continue the discussion initiated regarding the definition (Jones) and application (Conklin) of participation in children with prolonged disorders of consciousness (DoC).
We have been cautioned that "focusing on evaluated well-being at the expense of experienced well-being risks underestimating overall quality of life in patients that remain capable of positive affective experiences" (Graham 2021). How do we attempt to objectively assess participation, involvement, or engagement in patients without or with limited external indications of cognitive, behavioral, or emotional outputs?
While many measures are available globally for the evaluation of participation and focus on the concept of participation for children with disabilities is growing, a gold standard participation assessment for use with pediatric patients experiencing prolonged DoC does not currently exist. Measures utilized in research to capture participation specifically for patients who have experienced DoC were designed for use with adults (e.g., PART-O; Malone 2019). Many of the current measures available for evaluating participation in children were developed for children with varying congenital disabilities (e.g., PEM-CY; Coster 2013). Existing measures may lend themselves to

support increasing objectivity in rating participation but are likely to rate this patient population as having severe impairments in participation, potentially without appreciating the nuances involved.

The Disability Paradox is defined as the phenomenon through which individuals with "serious and persistent disabilities report that they experience a good or excellent quality of life" while "to most external observers these individuals seem to live an undesirable daily existence" (Albrecht 1999). Principles of neuro-ethics promote the importance of including perspectives of the individual while also noting the complexities of promoting autonomy in patients with DoC knowing that "capacities that are prerequisite to autonomy are themselves disordered" (Young 2021).

One could infer that families who perceive greater levels of functioning may be more likely to support and promote participation. Families in our follow-up clinic have reported varied levels of participation informally, but many subjectively report behaviors associated with emergence not captured in objective assessment. It is not uncommon for families of children presenting with non-responsive wakefulness syndrome to report successful use of robust eye-gaze communication systems while objective assessments indicate limited to no visual responses. Other families may report limited participation outside of school despite consistent affective responses to salient topics of conversation.

How do we balance remaining objective while also continuing to support the unique perspectives, beliefs, and needs of patients and their families? Do our current practices and protocols support or deter this from happening? How can therapists and families prioritize opportunities for engagement? This session will look to the research, clinician perspectives, and lived family experiences to guide us towards answers, and acknowledge the significant complexity in assessing participation in this population.

398 how to Engage Persons with Lived Experience? Putting the Person at the Centre of Traumatic Brain Injury Care through Clinical Practice Guidelines and Care Pathways

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ABSTRACT

Introduction: Traumatic Brain Injury (TBI) affects millions of individuals worldwide and is the leading cause of death and disability. Healthcare systems have traditionally structured and maintained TBI care using a medical expert framework, where clinicians direct the care of their patients and use their expertise to make key clinical decisions with limited input from the 'patient.' In this framework, the way in which care is delivered is often more to the convenience of the clinician. The assumption that the clinician always "knows best" often leaves patients and their families without agency or investment in their recovery.

Objective: Co-create patient-centered clinical guidance: (1) a TBI Guideline – evidence-based recommendations that help guide clinical decisions and (2) an Ideal Care Pathway – standardized approach for TBI care across the different care stages (pre-acute, acute, specialized care/management, and community) – that prioritize patient agency and collaboration.

Methods: The development of the Clinical Practice Guideline for the Rehabilitation of Adults with Moderate to Severe TBI and the Neurotrauma Care Pathways' Concussion and Moderate to Severe TBI Ideal Care Pathways employed a rigorous multi-step approach that prioritizes voicing the rehabilitation and recovery needs of Persons with Lived Experience (PWLE) to healthcare professionals, managers, and support workers. At each stage of the Living Guideline and Care Pathways activities, PWLE were engaged to (1) identify priorities and gaps in TBI care and (2) review, evaluate and co-create recommendations and updates. PWLE are key partners and members of the Guideline Expert Panels and Neurotrauma Care Pathways' Steering Committee. Their perspectives are integrated alongside expertise from clinicians, researchers, and healthcare funders. A feedback validation process is implemented after each formal consultation; this involves providing group or individual summaries to PWLE to ensure that all key messages have been accurately represented and to allow for further input and/or necessary changes to be made.

Results: The co-created Living Guideline recommendations and Ideal Care Pathways address the real-world needs and priorities of PWLE and enhance shared decision-making and patient engagement. Guideline recommendations have been added to ensure the agency of PWLE is cultivated during acute and rehabilitative care and that hope for continued recovery after discharge is instilled. Consensus recommendations are divided into sections addressing priority areas for PWLE where high level research evidence is not common (e.g., sexuality and intimacy, peer support for PWLE, family members and caregivers). Key outcomes include (1) PWLE feeling more respected and involved in their care journey and (2) clinicians gaining practical tools to support a patient's ownership of their recovery.

Conclusion: This shift in process and clinical guidance to patient engagement and co-creation represents a critical advancement in patient-centered TBI care, empowering patients, improving recovery outcomes, and fostering collaborative relationships between clinicians and patients.

399 TRANSCENDENT Concussion Research Program: Evaluating the Knowledge Translation Efforts of a Canadian Initiative to Advance Concussion Research and Care

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ABSTRACT

Background: Concussions are a health concern for many Canadians. Despite the frequency of these injuries, there remain gaps in research and care. Accordingly, the TRANSCENDENT Concussion Research Program, an initiative funded by the Ontario Brain Institute, was developed to support the advancement of concussion research and care for all Canadians. A key pillar of the TRANSCENDENT program is Knowledge Translation (KT). KT supports dissemination and implementation efforts and can ensure that the latest evidence and best practices are shared with and applied by key knowledge users, including children, families and healthcare professionals. The objectives of the present study were to assess the reach of the initial KT efforts for TRANSCENDENT and to identify opportunities for future KT initiatives.

Methods: A KT team was formed comprised of concussion researchers and KT specialists. The KT team developed a framework, guided by the Knowledge to Action Framework, to help build an initial KT plan to spread awareness around the research program and its activities. Key components of the KT plan included the (1) development of community-facing materials, including a website, social media account, podcast, and informational handouts, (2) creation of clinician and research-focused materials and learning opportunities to facilitate knowledge sharing and advance concussion care and, (3) formation of a Community Advisory Committee (CAC) to support future KT initiatives. Information regarding reach was gathered through website and social media analytics from November 2023- April 2024.

Results: A public-facing website (transcendentconcussion.ca) and X account were created (@TRANSCENDENT_KT) to share information about the research program. Together, the website and X posts were viewed 9,557 times. Two informational handouts to support the research program were developed and shared at community outreach events, and one community-facing podcast episode featuring a pediatric physician was recorded. Dissemination of the latest concussion research and clinical recommendations included 5 speaker series events held for concussion researchers and medical professionals who work with pediatric concussion. Two KT products were developed with specific recommendations for health professionals to support concussion care. Finally, an initial CAC made up of individuals with lived concussion experience (n=6) was formed.

Discussion: Initial KT efforts, guided by a KT Framework, allowed for the broad dissemination of information and materials related to the TRANSCENDENT program. There is a need for further KT efforts, particularly directed at the community, to get the latest concussion information to the broader public. Future efforts will be identified and implemented alongside the CAC to ensure that the voices of key end users are being reflected in the dissemination and implementation processes. As KT efforts continue, there is a need to evaluate them to further knowledge around best practices for disseminating and implementing concussion research.

400 Acceptance and Commitment Therapy for Individuals with Persistent Post-Concussion Symptoms Following Concussion: A Non-Concurrent Multiple Baseline Single-Case Experimental Design Study

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ABSTRACT

Background: After a concussion a subgroup of patients continues to experience symptoms up to several months or even years after injury, referred to as persistent post-concussion symptoms (PPCS). PPCS are associated with a substantial decrease in quality of life, loss of work productivity, and high economic costs. However, evidence-based treatment options are limited. Reduced psychological flexibility – the ability to act in alignment with values in the presence of inner discomfort such as pain and distress – is proposed to play an important role in the development and maintenance of PPCS. Acceptance and commitment therapy (ACT), a third-wave behavioural therapy that aims to improve psychological flexibility, is therefore a promising treatment option.

Objectives: The current study aimed to evaluate the effectiveness of an ACT intervention in patients with PPCS. The primary objectives were to evaluate the effect of ACT on satisfaction with daily functioning, acceptance, and value-based behaviour after treatment and at three months follow-up. The secondary objectives were to evaluate the effect of ACT on psychological distress, PPCS, and cognitive fusion.

Design: A non-concurrent multiple-baseline A-B single-case experimental design (SCED) with a randomized baseline was conducted. The baseline phase (A-phase) was 2 to 5 weeks, the treatment phase was 14 weeks, and the follow-up phase was 12 weeks (treatment+follow-up = B-phase). Repeated measurements were taken daily during baseline and weekly during treatment and follow-up, and additional measurements were taken with questionnaires at 5 different time points throughout the study.

Participants: 6 participants seeking help for PPCS and referred to the Medical Psychology department of VieCuri Medical Center participated in the study.

Outcome Variables: Primary outcomes were satisfaction with daily functioning, acceptance, and value-based behaviour. Secondary outcomes were psychological distress, post-concussion symptoms, and cognitive fusion.
Results: The repeated measures of the primary outcomes showed moderate to large improvements in satisfaction with daily functioning, moderate to very large improvements on acceptance, and small to moderate to large improvements on value-based behaviour. Assessment using questionnaires revealed reliable improvements in quality of life for five participants, in acceptance for two participants, and in value-based behaviour for two participants. All participants experienced improvements regarding secondary outcomes; psychological distress, post-concussion symptoms, and cognitive fusion, which was a reliable improvement for some participants.
Conclusions: This study offers initial evidence that ACT may be effective in treating individuals with PPCS following a concussion. The findings suggest that ACT can enhance satisfaction with daily functioning, promote greater acceptance (by reducing the struggle with symptoms), and enable individuals to engage in value-driven behaviors. Further research is needed to confirm these findings on the effectiveness of ACT for PPCS.

401 Predicting Long-Term Functional Independence of Patients With Traumatic Brain Injury in the Neurorehabilitation Setting: A Retrospective Machine Learning Study

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ABSTRACT

Introduction: Accurate prognosis in TBI is essential for effective treatment and rehabilitation planning, anticipating potential complications, and setting realistic expectations for both patients and their families. A precise prognosis also helps optimize the allocation of medical resources and improve long-term outcomes. A substantial amount of research has focused on predicting patient survival in the first hours to weeks following TBI. However, few studies have examined prognosis during the chronic stages of the condition, specifically in a neurorehabilitation setting where patients are stable, and the available information and expectations differ. The aim of this study was to predict the functional independence of TBI patients one year after admission to a neurorehabilitation center.
Methods: The demographic and clinical data of 209 TBI patients, admitted to a long-term neurorehabilitation center and not in a post-traumatic confusional state (PTCS), were retrospectively analyzed. Their motor and cognitive functions, communication abilities, emotional state, behavior, and functional independence -assessed with the Functional Independence Measure + Functional Assessment Measure (FIM+FAM)- were assessed at admission, and again at 6 and 12 months post-admission. Six different machine learning models aiming to predict the FIM+FAM scores one year post-admission, were trained incrementally, where each model built upon the information from the previous one, adding new, specific data. The additional information incorporated by the models included: (i) demographic data; (ii) injury-related data; (iii) global independence; (iv) clinical condition at admission to the neurorehabilitation program; (v) clinical condition at 6 months post-admission; and (vi) progression from admission to the 6-month follow-up.
Results: Random forest models achieved the highest performance. The models had increasing accuracy at predicting the FIM+FAM scores, with an explained variability (R-squared) and prediction error (RMSE) of: (i) 14.3% and 23.3; (ii) 23.8% and 22.0; (iii) 47.7% and 18.2; (iv) 62.1% and 15.5; (v) 90.6 and 7.7; and (vi) 91.1% and 7.5. After hyperparameter optimization, the final model had a R-squared of 93.1% and RMSE of 6.6. Consequently, the model was able to predict the FIM +FAM scores with an average prediction error of 6.6 over 210 points. The FIM+FAM score at 6 months post-admission and the progression in the FIM+FAM from admission to 6 months follow-up were the most relevant predictors.
Conclusions: The data used in predictive studies during the acute stage has very limited value for predicting outcomes in the neurorehabilitation setting. In contrast, functional independence at 6 months post-admission, and the progress made from admission to this point (among other variables) can accurately predict functional independence one year after admission.
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402 Daily Self-Monitoring Of Persistent Post-Concussion Symptoms in an Mhealth App and the Relationship with the Retrospective Rivermead Post-Concussion Symptoms Questionnaire

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ABSTRACT

Most people recover spontaneously following a concussion, however, there is a subgroup of people who experience persistent post-concussion symptoms (PPCS) months or years following the concussion. PPCS are complex and vary greatly between people. Enhancing our understanding of PPCS is crucial to improve diagnostics and treatments. This effort may be limited by the methods used to assess PPCS, which often depend on retrospective memory reports, which can be susceptible to memory bias. They may not accurately reflect the day-to-day variability in PPCS, leading to an incomplete representation of symptom experiences. In order to gain more insight into the day-to-day variability we developed and studied the feasibility of an mHealth application that allows individuals to self-monitor their PPCS in real time. This study aimed to assess the strength of the relationship between the real-time experience of PPCS as measured with the new mHealth application and the commonly used retrospective Rivermead Post-Concussion Symptoms Questionnaire (RPQ). Twenty-three individuals with PPCS self-monitored their symptoms daily for four weeks using an mHealth application. Prior to this, the participants rated which PPCS impacted them the most. Participants monitored the intensity of their symptoms once a day on a numeric 11 point scale from zero to ten. Afterwards, the participants rated their symptoms for the past 7 days retrospectively with the RPQ. Here we present preliminary analyses from 14 participants with complete data. From the primary PPCS ratings we calculated: total average, highest score, lowest score, and PPCS on the final day for both the total period as for the last eight days. Eleven participants indicated that headache was their primary symptom, two fatigue, and one light sensitivity. The preliminary analyses show that the day with the highest symptom intensity seems to correlate the highest with the RPQ score of that symptom. Furthermore, individuals with similar RPQ scores demonstrated highly different day-to-day PPCS patterns. Additional analyses, including within-person standard deviations, mean squared successive differences, and daily scores on the impact of PPCS on functionality and quality of life, will be presented at the conference.

403 "Exploring The Impact Of Biological Sex And Healthcare Accessibility On Recovery Outcomes In Adolescent Sport-Related Concussion"

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ABSTRACT

Background: Recovery from sport-related concussion (SRC) is multifaceted, often influenced by individual factors and the broader context of healthcare access. While studies have shown that biological sex may contribute to acute symptomatology following a concussion, findings have been mixed regarding impact on recovery duration. Improved access to care has been suggested to lessen such disparities. This study aimed to explore the role of biological sex and healthcare accessibility in recovery duration and risk for persisting symptoms following SRC in adolescent athletes.

Methods: This retrospective cohort study included athletes aged 13-18 evaluated through a pediatric academic medical center's sports medicine program in one of two settings: a hospital-based specialty clinic or on-site at a sport focused boarding school. Inclusion criteria were an evaluation in either setting within 7 days post-SRC. The study focused on two primary independent variables: the athletes' reported biological sex, and the clinical setting where they received care. The latter was indicative of healthcare accessibility, with the boarding school providing immediate and daily access to a full spectrum of multidisciplinary sports medicine and rehabilitative services. Primary outcomes included recovery duration from injury to asymptomatic clinic encounter and persisting symptoms at 28 days post-injury. Analyses included data from athletes whose recovery duration fell within 2 standard deviations of the sample mean (N=1281).

Results: Linear regression revealed a significant association between female sex and longer recovery time (female mean days = 18.55, 95% CI =15.71-24.28; male mean days = 14.26, 95% CI = 11.55-20.12; B = -4.341, $p < .001$). Logistic regression echoed this finding, indicating that the odds of persisting symptoms at 28 days was 62.3% higher for females than males (Exp(B) = 0.377, $p < .001$). When considering clinic setting, chi-square tests demonstrated a significant association between biological sex and recovery status in the hospital-based clinic ($\chi^2 = 30.582$, $p < .001$), with females showing a higher likelihood of persisting symptoms compared with males (21.6% and 7.7%, respectively). In contrast, no significant difference was observed in the sport focused boarding school ($\chi^2 = 0.207$, $p = .649$). Results also indicated that athletes from the sport focused boarding school experienced lower rates of persisting symptoms (6%, Exp(B) = 0.428, $p = .003$) and overall shorter recovery duration (mean days = 12.48, 95% CI = 9.26-18.27) than female athletes from the hospital-based clinic.

Conclusions: The study provides evidence that biological sex is a determinant of recovery duration and symptom persistence in adolescent SRC, with females at a disadvantage compared to males. However, healthcare accessibility mitigates these sex-based differences, comparable to findings in collegiate athletes. Findings underscore the importance of personalized care and early access to comprehensive rehabilitation in managing SRC, considering both the biological and socio-environmental factors influencing recovery.

404 The Feasibility and Acceptability of a School-Based Peer-Led Concussion Education Program for Canadian Youth: A Mixed-Methods Study Using the RE-AIM Framework

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ABSTRACT

Background: Concussion education programs delivered in schools are well-positioned to educate youth athletes and non-athletes about concussions. However, school-based concussion education programs have often been delivered solely to student-athletes and have seldom been evaluated. Accordingly, there is a need to develop and evaluate a school-based concussion education program that can be delivered to the entire student body. The objective of this study was to implement a school-based, peer-led concussion education program (Youth Concussion Awareness Network (You-CAN)) in a sample of Canadian high schools to assess the feasibility, acceptability, and preliminary impacts of the program using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) Framework.

Methods: During the 2021-2022 school year, four Canadian high schools consented to participate in You-CAN. Key components of You-CAN involved: (1) the creation of a student-driven concussion council and (2) the delivery of a school-wide concussion awareness campaign by the concussion council. School-wide surveys were completed at two time points during the school year (n=35 paired). Primary outcomes of interest were the impacts of the concussion awareness campaign on concussion knowledge and intended concussion behaviours (i.e., concussion reporting and provision of social support). Qualitative interviews were held with concussion council members (n=6) and supporting school staff (n=5) and focused on program implementation, acceptability, and feasibility. Quantitative survey data was analyzed using descriptive statistics and qualitative interview data was analyzed using a content analysis. Mixed-methods integration occurred at the interpretation and reporting levels across the dimensions of the RE-AIM Framework.

Results: (Reach) Twelve students were recruited to participate in their school's concussion council. (Effectiveness) Among students who completed the program evaluation, there were mixed findings regarding changes in concussion knowledge and intended behaviours. However, in qualitative interviews, most concussion council members reported that their school's concussion awareness campaign increased their own and their peers' concussion knowledge. (Adoption) Seventy-five percent of schools that consented to participate in the You-CAN program adopted the program in their schools. In qualitative interviews, supporting school staff reported adopting You-CAN because it aligned with school priorities and because they appreciated the peer-led nature of the program. However, their school setting and external factors (e.g., COVID-19) influenced the degree to which the program was adopted. (Implementation) The majority of council members and supporting school staff reported being pleased with their concussion awareness campaigns. However, they noted barriers to implementation, such as feeling rushed to plan their campaigns and struggling to coordinate meetings with council members.

Conclusions: The You-CAN program appears to be a feasible and acceptable way to deliver concussion education within schools. Further studies are required to better understand the program's impact on concussion knowledge and behaviours. The learnings from this study will inform modifications to the program prior to its broader implementation.

405 The Child-In-Context Intervention – Results and Process Evaluation Of A Goal-Oriented Intervention In The Chronic Phase Of Pediatric Acquired Brain Injury

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ABSTRACT

Aim: Present results and clinical implications of a goal-oriented and individualized rehabilitation intervention for children with acquired brain injury (ABI), their families and their schools: the Child-In-Context-Intervention Study (CICI).

Methods: The CICI is a randomized controlled trial (RCT) investigating the effect of a goal-oriented individualized intervention containing seven telehealth family sessions, four school-meetings and a parent seminar. The aim was to enhance everyday functioning at home and in school. This presentation will combine study data regarding goal attainment, efficacy analysis of the RCT, and qualitative and

quantitative process evaluation (e.g., acceptability, usefulness, experienced impact, and fidelity data).
Results: Fifty-eight children, their families and their schools were included. Children were aged 6-16 years (48% girls), median of 6 years post injury. Most parents lived together, and all children attended school. Causes of ABI were TBI (16), tumors (15), stroke (10), infection (8), anoxia (6) and other (3). Goal Attainment Scaling (GAS) was established for all 90 SMART-goals set in the intervention group. Results showed high goal attainment, with positive progress (mean 2.1 steps on GAS) on 94 % of the goals. The CICI group reported significantly greater improvements in unmet health care needs, family function, and parental anxiety and depression. No differences were observed on the primary outcomes of parenting self-efficacy and brain injury symptoms nor on child-reported measures. The intervention group was highly satisfied with the intervention. On a custom-made acceptability scale with score range from 1-5, median ratings ranged from 4 (children) to 4.6 (parents). Qualitative interviews were conducted with 12 persons from six families, revealing that the families highly appreciated the school-home collaboration, the increased understanding of the children's and families' challenges, as well as the positive progress on their challenges. Attendance and adherence to protocol was high, and a process evaluation revealed a high degree of adaptability of the intervention to the individual needs and resources of each family.
Discussion: The CICI resulted in positive treatment effects at the individual family level. At a group level, the intervention improved contextual factors that are known to influence a child's long-term rehabilitation outcome, such as family functioning and parent mental health. The intervention was appreciated for its holistic approach in including both family and school, for the knowledge conveyed and for the flexible approaches it offered. The presentation will discuss challenges regarding the measurement of individualized rehabilitation at a group level and questions regarding the validity of child report, as well as clinical implementation implications of the study.

406 Traumatic Brain Injury is Associated with Earlier Diagnosis of Mild Cognitive Impairment in United States Military Service Members

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ABSTRACT

Background: The rate of traumatic brain injuries (TBI) in military service members has continued to increase over the past 25 years, with nearly 500,000 United States military service members sustaining a TBI since 2000. A history of TBI has been associated with an increased lifetime risk for developing mild cognitive impairment (MCI). Further, such changes may occur earlier in these individuals than in those without a history of TBI. This retrospective study sought to determine if there is an association between a history of TBI and risk for early-onset MCI (defined as appearing before age 65).
Methods: The United States Veteran's Administration Informatics and Computing Infrastructure (VINCI) database was utilized to select a cohort of former military service members that had medical record data that included clinical neurological assessment. This dataset was then limited to those that had information on history of TBI as of 2008 and then these records were queried for ICD-9 and ICD-10 diagnoses of MCI between 2008-2020. A Fine-Gray competing risk model was used, with age to the first assessment used as the time axis.
Results: A total of 316,269 patients had clinical neurological assessment records. Of these, a total of 74,971 military service members (87% male, 68% Caucasian, mean age at first assessment 42 ± 13 years) had a reported TBI history. Those that reported a positive history of sustaining a TBI (3.8%; n=2,902) were more than twice as likely to have a diagnosis code for MCI as those without a history of TBI (Hazard ratio [HR]: 2.35, 95% CI: 2.24-2.46). This risk was similar when adjusted for race and gender. For those that sustained a TBI, female veterans were less likely to experience cognitive impairment than males (HR female 1.89 [CI: 1.59-2.25] versus HR male 2.36 [CI: 2.25-2.48]; interaction p value < 0.001). Regardless of sex, those that experienced a mild TBI (n=678) were less likely to be given a diagnosis of MCI than those that experienced a severe TBI (n=2,224; HR 1.66 [CI: 1.49-1.84] versus HR 2.62 [CI:2.48-2.76], respectively).
Discussion: Those with a history of TBI were more likely to have a diagnosis of early-onset MCI than those with no history of TBI. This risk was higher for those with more severe injuries, and in male patients. Given the prevalence of TBI, policies should be put in place to support prevention, early detection, and treatment of this common injury and its long-term consequences.

407 When To Stop VTE Thromboprophylaxis in Neurorehabilitation Settings: A Discussion Paper

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ABSTRACT

Background: Brain injury and other acute neurological conditions associated with immobility carry risk of venous thromboembolism (VTE). However, the most appropriate duration of treatment where reduced mobility persists remains undefined. Evidence that heparin may have a neuroprotective effect following haemorrhagic brain injury also adds to the treatment decision dilemma. Anecdotal evidence suggests that informal policies for VTE prevention have evolved in rehabilitation units in the absence of any nationally or internationally recognised guideline. This identifies a need to clarify the evidence base for VTE prevention. AIMS The aim is to review evidence in relation to VTE risk and its management in the neurorehabilitation setting.

Methods: Systematic searches were carried out using the Medline database. Search strategies combined variations on the terms "brain injury" or "stroke" or "neurorehabilitation" with terms that described "VTE/venous thromboembolism" and with the term "prophylaxis". Relevant articles were selected for inclusion in a narrative review.
Results: The majority of articles focused on epidemiology and risk factors including screening for asymptomatic VTE. Three articles reported prevalence of subclinical DVT at time of neurorehabilitation admission (through duplex ultrasound screening) with rates varying between 4% and 21% depending upon neurological diagnosis. There were much more limited data on the risk of new VTE developing during neurorehabilitation. One observational study used propensity score adjustment to examine the efficacy of pharmacological VTE prophylaxis in traumatic brain injury rehabilitation. This did not show a clear benefit in favour of treatment and rates of VTE were low (1.6% in those with treatment and 1.8% in those without). There are more data relating to VTE prevention after stroke, with studies reporting effectiveness of both mechanical (Intermittent pneumatic compression devices) and pharmacological prophylactic strategies. These give varying estimates of benefit with clear risk profiles. However data to guide choice and duration of prophylaxis specifically in the neurorehabilitation setting is far more limited leaving a gap in the evidence base.
Conclusions: The evidence base for VTE prevalence and prevention is diverse. In presenting the summarised evidence we hope to trigger discussion at congress that might lead to a strategy for developing guidance.

408 Social-Legal Discourse in Adults with and without TBI: Quantitative and Qualitative Analyses and Implications for Public Policy

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ABSTRACT

Deficits in discourse, or cohesive verbal macrostructures characterized by thematic progression, are common following traumatic brain injury (TBI), and prior studies have shown that individuals with TBI produce discourse that is of poorer microlinguistic and macrolinguistic quality. Post-TBI deficits in discourse may be particularly relevant in legal contexts, which depend heavily on discourse-based communication; however, the relationship between TBI and social-legal discourse, or discourse about social-legal themes, has not been well characterized quantitatively or qualitatively.
Objective: To characterize social-legal discourse in adults with and without TBI.
Method: Participants, 19 adults with moderate-to-severe TBI and 21 uninjured comparison peers, completed a legal-knowledge interview in which they were prompted to discuss laws and legal systems. Dependent quantitative variables were microlinguistic and macrolinguistic features of participants' discourse. We then used grounded theory to define qualitative thematic categories within participants' discourse.
Results: The TBI group produced more overall microlinguistic errors, $t(38) = -3.07$, adjusted $p < .05$, $\eta 2p = .20$, and more overall macrolinguistic errors, $t(38) = -2.86$, adjusted $p < .05$, $\eta 2p = .18$, than the comparison group. This corresponded to a higher rate of both microlinguistic errors $t(38) = -3.08$, adjusted $p < .05$, $\eta 2p = .20$, and macrolinguistic errors, $t(38) = -3.94$, adjusted $p < .05$, $\eta 2p = .29$, than participants in the comparison group. Number and rate of microlinguistic and macrolinguistic errors were positively correlated with working memory, verbal memory, and processing speed. Thematically, participants in both groups defined legal systems through three major categories (normative rules, legal procedures, and structural characteristics). There were no between-group differences in any of the thematic categories. Participants' discourse was often technical and complex, defining a clear "arrest-trial-jail" schema and well-defined roles for legal actors, but participants struggled to expand on their knowledge or to answer questions based on their knowledge.
Conclusion: Adults with moderate-to-severe TBI produced social-legal discourse of poorer micro- and macrolinguistic quality than their uninjured peers, although discourses were thematically equivalent across groups. Results suggest that linguistic quality, not informational or thematic content, is a feature of social-legal discourse following TBI. Findings point to areas of communication limitations for individuals with TBI in social-legal contexts, identify possible avenues for accommodation, and underscore structural communication risks within social-legal systems.

409 "I Just Want to be at Home"- The Benefits of Early Access to Rehabilitation and Smooth Transitions From Hospital to Community Based Rehabilitation. Life Redesign's Functional Approach and CONNECTing it to Neuroplasticity

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ABSTRACT

The benefits for individuals with acquired brain injuries (ABI) being afforded early access to rehabilitation and experiencing smooth transitions from hospital to community settings have

been widely established in the ABI literature. Ontario Health and the Ontario Neurotrauma Foundation (ONF) emphasize the importance of having the right care at the right time and place. ONF's #1 standard states, every individual with an ABI should have timely, specialized interdisciplinary rehabilitation services that are initiated as soon as the condition of the person with the ABI allows." In 2021, CONNECT Communities and Hamilton Health Sciences (HHS) began a partnership to implement a service focused on early access and smooth transition to a functionally designed rehabilitation environment. This program supported 160 people who transitioned from Hamilton Health Sciences Hospital to CONNECT Communities—Hamilton. CONNECT's Life Redesign Model, deemed a leading practice through Accreditation Canada, focuses on meaningful community participation with an emphasis on social capital and meaningful community participation. The functioning of the 160 people was tracked from hospital discharge to their community setting. Using two standardized assessment measures (Care and Needs Scale - CANS and Mayo Portland Adaptability Scale - MPAI-4), it was possible to demonstrate that early access to a rehabilitation program that focuses on supporting people to engage in meaningful, functional activities that are embedded in everyday tasks, i.e., Life Redesign Model, yields positive outcomes. The MPAI-4 predicted that 67.5% of those who moved in would experience severe limitations. Upon move-out, only 22.9% fell in that same category. Likewise, the CANS predicted that 98.3% of the people could not be left alone for a few days, a week or more, but at move out, only 72% required that level of care. The results of this partnership demonstrated that early access to a transition rehabilitation program such as CONNECT made significantly positive changes for the people they support and their families. This presentation will share how outcomes are improved by having a smooth transition to rehabilitation that focuses on maximizing opportunities for neuroplasticity. Data related to having timely access to community-based rehabilitation and its effects on preferred move-out locations will be shared. It will also explain how the brain's plasticity is heightened shortly after brain injury, creating an optimal opportunity to form new neural connections and reorganize pathways through rehabilitation. Evidence will also be provided on the neuropsychological advantages of an innovative functional approach to rehabilitation, which maximizes neuroplasticity by specifically targeting relevant skills most applicable to an individual's daily life. This approach also enhanced their involvement in pursuing rehabilitation goals, increasing mood, autonomy, and motivation, all of which are key factors known to improve rehabilitation outcomes and, ultimately, help people to "just move home".

410 Cross-Sectoral Solutions: Strengthening Community Capacity to Address the 'Parallel Pandemic' of Gender-Based Violence-Related Traumatic Brain Injury Through a Survivor-Led Support Program

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ABSTRACT

Background: Brain injury among survivors of gender-based violence (GBV) is a critical issue, with 75-92% of women likely experiencing traumatic brain injury (TBI) from facial, head, and neck injuries. Research in Canada reveals a significant lack of awareness and research regarding TBI among both GBV service providers and survivors, which limits supports available to those affected. The intersection of GBV and TBI is important, as each is associated with cognitive, mental, emotional, and physical health challenges as well as elevated rates of unemployment, poverty, and houselessness. These issues lead to considerable economic impacts, including lost income, and higher costs for social and health-related services, thereby highlighting the need for GBV-TBI to be widely recognized and uniquely addressed.

Aim: This project addressed the gaps in research, support, and education for GBV-TBI survivors by piloting and evaluating a trauma-informed, multi-sectoral program. Utilizing the RE-AIM framework, the study assessed the effectiveness of a live-adapted program across diverse settings and populations in Canada. This program is survivor-led and developed with the support of WomenatthecentrE's Survivor Expert Collective (WE SEC).

METHODS: Twenty-five survivors from across Canada participated in a 20-week pilot program. An intake worker assisted survivors in identifying personal goals and necessary accommodations before joining the program. Participants completed a pre-survey to gather demographic data, health information, and details on their respective GBV-TBI causes and symptoms, along with their knowledge of any associated coping strategies. Survivors were matched with peer navigators, who provided one-on-one sessions of peer support, advocacy, system navigation, and referral services. In addition, participants could engage in virtual peer support groups, workshops, and group activities, such as music therapy, yoga, naturopathy, speech language pathology, and psychotherapy. Participants completed four interim surveys over the 20 weeks to ascertain

any gained knowledge and experiences and to provide, feedback allowing for real-time adaptations of the program. Upon completion of the program, a post-survey and a follow-up focus group were administered to evaluate the effectiveness and impact of the program. Quantitative data was analyzed using SPSS, while qualitative data and thematic coding was processed through MAXQDA.
Results: Participants benefited from project involvement through direct support for GBV/TBI related challenges. Some of these benefits included increased education around GBV and TBI care practices, pain management, and effective communications. Urgent needs around food access, housing, and financial security were also addressed. Participants stated feeling increased confidence and self-esteem, being better equipped to manage stress and GBV/TBI related symptoms with an overall increase in sense of community and agency.
Conclusion: The findings from this study will advance understanding of how to support survivors of GBV-TBI more effectively, and our knowledge mobilization framework will ensure adaptable sustainability efforts across the nation.

411 Beyond the Protocols: Defining and Enhancing Participation in Children with Prolonged Disorders of Consciousness

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ABSTRACT

Participation is frequently viewed as a key determinant of health. The World Health Organization's International Classification of Functioning, Disability and Health calls on clinicians to provide care that impacts their participation in valued life situations (WHO 2007). However, researchers are beginning to discuss the concept of participation as a "bidirectional construct" that "can be both an entry point ('process') and an outcome ('endpoint') of health and education services" (Imms 2017).
Although there is growing evidence supporting participation-focused assessment and intervention (Anaby 2021), clinical care continues to consist primarily of assessments and interventions with focus on body functions and impairments. This is particularly true for the Disorders of Consciousness (DoC) population. While serial assessment and protocols are a crucial component of acute management of DoC in order to understand current level of function and restore premorbid body functions, this often hinders the ability to engage patients in salient and participation-focused interventions. Fisher discusses the ethical challenges and importance of focusing on patients' values and notes that, although it will add complexity to patient management, "it is crucial to providing honest and ethical care" (Fisher 2017). This oral abstract integrates the concepts participation as a therapeutic 'process' and providing optimal ethical care to the pediatric DoC population, while identifying current barriers and advantages to implementation within this unique population.
While shifting goals of care to participation-focused interventions is optimal, it can be a challenging transition for families and clinicians as this "requires shift in perspective/values: from promoting doing things normally and correctly, nicely, or independently" (Anaby 2021). This can be especially challenging for the DOC population as patients have sustained significant functional changes that drastically impact the way preferred activities are executed compared to baseline. A TBI Models System Study found that patients who enter rehab without consistent command-following (even if having emerged prior to discharge) experience profoundly impaired levels of participation years later, even when compared to normative participation levels of individuals currently treated in inpatient rehabilitation (Malone 2019).
While many challenges exist with implementing participation-focused interventions, researchers have found that interventions focusing context and "real life" situations have demonstrated the most favorable outcomes for patients experiencing traumatic brain injury (Sveen 2022). Current research supports the use of salient stimuli and pre-injury hobbies are most effective for the pediatric DoC population (Irzan 2022). This focus on participation, particularly when including caregivers, may also ease the transition and quality of life following rehabilitation for families of patients experiencing DoC. In this oral abstract, we draw on current growing research in participation-focused practice and clinical experience with the pediatric DoC population to discuss barriers and in implementing a plan of care in which participation is the primary focus and outcomes indicator for intervention.

412 A Biopsychosociallegal Model of Neurodisability and Cognitive Communication: Insights from Empirical Research in TBI, Conceptual Scholarship, and Client Work

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ABSTRACT

Biopsychosocial models of (neuro)disability, such as the WHO's ICF model, provide a useful conceptual framework for understanding how cognitive functioning such as cognitive communication can be defined through the relationships among a person's biological, environmental, and individual

factors following traumatic brain injuries (TBI). These models are especially compelling for social-legal behaviors: Not only do social-legal contexts rely heavily on cognitive communication–supported activities and define behavior through functional terms (e.g., a person's need to "communicate effectively" with an attorney), they have structural and systemic cognitive-behavioral risk factors that exert pressure on the cognitive mechanisms that support behavioral activity and participation. Given the serious overrepresentation of neurodisabilities and conditions associated with neurodisabilities among law-involved populations, there is a need for biopsychosocial modeling of cognitive communication that can capture the predictable effects of legal contexts on human cognitive behavior.
Aim: I aimed to develop a "biopsychosociallegal" model of cognitive communication and neurodisability.
Method: I synthesized experimental findings of social-legal cognition in moderate-to-severe TBI, conceptual "neurolaw" scholarship, and professional legal experience to develop a social-legal framework of functional cognitive communication. Using the model, I illustrate how various legal conditions (e.g., adversarial orientations between two legal parties) will manifest within the functional biopsychosociallegal model.
Results: The biopsychosociallegal model defines cognitive communication around three key functional behaviors (accessing information, internalizing information, and interacting with information) and the underlying cognitive mechanisms. Analysis shows parallel top-down and bottom-up effects of the law on cognitive-communication functioning, wherein the law's structural characteristics tax the cognitive resources that support cognitive communication (bottom-up) and wherein the law's social-behavioral paradigms create participation dynamics that distort cognitive-communication activity (top-down). Analysis also shows the effect of biological factors (i.e., TBI), which likely influence social-legal participation through bottom-up effects on cognitive resources.
Discussion: The biopsychosociallegal model demonstrates that the law can be conceptualized in two overlapping ways: first, as a unique variable within a biopsychosocial framework whose effects on cognitive communication are negative, predictable, and structural; and second, as a biopsychosociallegal limiting event or space in which functional activity is undermined by the nature of the law itself. These interpretations raise diverging policy implications for persons with TBI (or other neurodisability-associated conditions). On the one hand, reform-based modifications to legal practices and procedures may be able to reduce or control for structural confounds; on the other, reimagination-based changes to legal systems as a whole may be needed to redefine the parameters of biopsychosociallegal cognitive communication and eliminate the possibility that the law itself manifests as a functional cognitive-communication limitation.

414 Employment Experiences of Women Survivors of Intimate Partner Violence-Related Brain Injury: What is Happening, What is Working, and How Support Professionals Can Do Better

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ABSTRACT

Background: Globally, one in three women will experience intimate partner violence (IPV) over their lifetime. Physical violence during IPV can cause neurological deficits, loss of consciousness, and brain injury (BI). IPV and BI are associated with elevated rates of unemployment, poverty, and homelessness, as well as increased mental health challenges. These social determinants of health impact women's wellbeing through access to safe accommodations, food security, and disability supports, leaving them vulnerable to ongoing violence and permanent disability.
This qualitative study (1) explored the intersection of intimate partner violence-related brain injury (IPV-BI) and employment; (2) identified support needs, priorities, facilitators, and barriers to service delivery; and (3) generated recommendations for improved outcomes.
Methods: Qualitative, semi-structured interviews lasting 60-90 minutes were conducted exploring: (a) survivors' experiences of work; (b) perceived employment-related support needs; (c) existing support programs, policies, and practices; (d) valued characteristics of healthcare and social support services; and (e) systemic challenges to employment. Participants were purposively recruited from a national informal IPV-BI network, or through snowball sampling. Twenty-four individuals participated: six women survivors, six executive director/program managers, seven direct service providers, and five employer/union representatives. Interviews

were audio-recorded and transcribed verbatim. Ethical approval was granted by University of Toronto and Wilfrid Laurier University Research Ethics Boards.
Findings: Using a qualitative, thematic analysis approach, descriptive codes were attached and then grouped into broad, topic-oriented categories. Memoing, reflexivity, and triangulation were used to enhance rigour. Trustworthiness was maintained through debriefing, analyst triangulation, regular meetings to discuss and ensure code consistency, and development of an audit trail. Findings include the extraordinary level of complexity within the intersection of IPV-BI itself, the impact of a socially derived culture of shame and stigma that shapes the experience of IPV-BI, and the recognition/consideration of the complex layers of power that survivors are exposed to, both structural and individual. Micro level findings present the lived experiences of women survivors, the importance of work, and practical challenges to obtaining and/or maintaining employment. They also explore what is working and what support professionals can do to improve outcomes. Findings were used to develop a module detailing employment needs and solutions on the Abused and Brain Injured Toolkit (www.abitoolkit.ca) and recommendations for practice and policy.
Conclusion: This project addresses a critical gap in understanding the impact of IPV-BI on employment experiences. It is the first investigation of its kind globally, providing insights, resources, and practical solutions to better support women exposed to IPV-BI.

415 Motion Capture Technology and the eTherapy App with Patients Experiencing Post-Concussive Syndrome Symptoms Including Visual Tracking Deficit: A Methodological Case Study Design

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ABSTRACT

Background: The eTherapy app was created through a collaboration of computer engineering and occupational therapy and was developed originally for patients with orthopedic injuries working on motor re-education. The app uses motion capture technology of a 9-axis Accelerometer Inclinometer Inertial Measurement Unit (IMU) to measure a range of motion. The IMUs are attached to the patient on both sides of a targeted joint and connect through Bluetooth to the Android mobile device with the app. A prior study using the expert opinion process identified a novel feature of the app in patients' status post-traumatic brain injury and experiencing visual tracking deficits.
Methods Researchers utilized a case study methodology with an expert opinion process to advance the app and add a feature designed to be used in intervention with post-concussive patients experiencing deficits in visual tracking and smooth pursuits. Researchers introduced the visual tracking feature to two occupational therapists specializing in concussion rehabilitation and demonstrated its capabilities. The therapist used the visual tracking feature with three patients who met inclusion criteria and logged and journaled on its utility before participating in a semi-structured interview.
Results: The visual tracking feature was added to the eTherapy app. In the smooth pursuit activity, an IMU sensor was attached to the patient's forehead, and the other IMU sensor was attached to the back of the patient's hand. Sensory feedback was provided when the forehead sensor was aligned with the hand sensor. Some difficulty existed with this app activity in function as the position of the hand sensor changed with the grasp required. The therapists proposed and implemented a second activity involving perceptual midline shift. This new activity resulted in valuable data documenting whether the patient could move the midline of their head to match the center of a diagram, where the second IMU was placed.
Conclusions: While the eTherapy application is still being developed, measuring movement, including velocity, smoothness, and duration, may be beneficial. The eTherapy app showed promise for visual motor integration in smooth pursuits but would need further development in protocol use in functional tasks. The app showed promise for use in the assessment and intervention of perceptual midline shift. The app is portable and inexpensive, making it appropriate for in-clinic and possibly home programming.

416 Building an Integrated Support Network for Women Victims of Intimate Partner Violence and Traumatic Brain Injury

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ABSTRACT

Introduction: Globally, an estimated 44% of women have experienced intimate partner violence (IPV) and as many as 75% of those having experienced physical violence sustain a traumatic brain injury (TBI) secondary to blows to the head, face and neck, making the intersection between IPV and TBI a vastly underestimated public health problem. Considering the multiple service sectors involved in responding to the needs of these women, previous studies have shown the need for cross-pollination of knowledge across service sectors and system-level support for integrated and coordinated care. However, little is known about the application of these proposed best practices in the current system of care. In Quebec, Canada, services involved in addressing IPV are done in silos, and the screening for possible TBI in this population is lacking, thus hindering access to adequate services. This study aimed to (1) explore the challenges faced by key service providers in Montreal, Canada, in addressing the complex needs of women victims of intimate partner violence (IPV) with possible traumatic brain injury (TBI), and (2) examine the collaboration, or lack thereof, between these service sectors.

Methods: This study is part of a multi-step, community-based participatory research project. In this preliminary phase, data were collected by an occupational therapy student and a law student through field observations and individual interviews with stakeholders across healthcare, law enforcement, local police, and community services. Data were analyzed thematically.

Results: Findings highlight two key issues: the lack of services that address both IPV and TBI and the difficulties in fostering collaboration between sectors. Gaps in communication, coordination, and mutual understanding across sectors, including healthcare, community, and socio-judicial services, limit the effectiveness of interventions. Although some service providers offer direct support to women victims of IPV, TBI is frequently overlooked or misdiagnosed resulting in inadequate treatment. Moreover, many victims are unaware that they may have sustained a TBI until they are thoroughly evaluated by trained professionals.

Conclusion: This study suggests that restricted access to adequate services for women with possible TBI following IPV is mainly caused by a lack of knowledge about the intersection between TBI and IPV, and a lack of integration between socio-legal, community, and healthcare sectors. Raising awareness across IPV and TBI services of the need to strengthen collaborative approaches across service sectors to establish points of liaison should be deemed essential by all involved services to move towards an adequate ecosystem of support for women with TBI and IPV.

417 The Intersection of Intimate Partner Violence and Brain Injury: Findings From an Emergency Summit Considering Service Access and Delivery

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ABSTRACT

Background: One in three women experience intimate partner violence (IPV) in their lifetime. The majority of injuries to women experiencing IPV are to the head, face, and neck, leaving survivors at high risk for brain injury (BI). It is estimated from violence history and symptom reports that 75-92% of female IPV survivors are living with probable BI and possibly bearing the accompanying physical, cognitive, and mental health consequences of both IPV and BI. However, the intersection of IPV and BI (IPV-BI) remains largely unrecognized. Engaging in a community-based conversation to generate interdisciplinary solutions, the research team convened a national multi-stakeholder summit. This summit brought together BI and IPV experts and led to the development of a national agenda to address the enormous gap on the IPV-BI intersection and to advance IPV-BI care. Here we report on the care-level findings from this summit and consider barriers, needs, and priorities related to healthcare and support services for women survivors of IPV-BI.

Methods: Using a community-based participatory research approach, we engaged 30 key partners - drawn from a national IPV-TBI Knowledge-to-Practice (K2P) Network including diverse women survivors, service providers, researchers, and decision makers - in two half-day virtual meetings. The objectives for the summit were to (1) identify needs, facilitators, and barriers to care for women survivors of IPV presenting with TBI; and (2) co-create ideas for resources

and principles for identification, clinical care, and support for healthcare practitioners who treat women exposed to IPV-BI. Data were gathered through small group breakout sessions using semi-structured discussion guides. Sessions were recorded, transcribed verbatim, and analysed using thematic analysis techniques. Key partners contributed to analysis and knowledge translation through member checking activities. Research ethics board approval was obtained through the University of Toronto.
Findings: Three main themes around service access and delivery emerged from the discussions: (1) challenges and benefits of screening for brain injury among women survivors of IPV; (2) missing elements of support; and (3) ongoing need for widespread education, awareness, and advocacy. We explore these findings here and provide research and practice recommendations and suggestions.
Conclusion: The findings here add much needed information to our current understanding of support needs among women survivors. The recommendations can contribute to a global agenda for IPV-BI research and practice.

418 Teaching Educators About Acquired Brain Injury (TeachABI) – Examining Educator's Understanding of ABI in the Classroom

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ABSTRACT

Background: Acquired brain injury (ABI) is the leading cause of disability and death among children worldwide. ABI can result in cognitive, behavioural, emotional, physical, and communication difficulties. The lack of supports provided to children/youth, and families post-ABI often leaves the primary support of students with classroom educators. Unfortunately, educators are largely underprepared to accommodate the learning needs of students with ABI. To address this critical gap in educator learning, Scratch and an interdisciplinary team created an e-learning module, titled TeachABI, to enhance educator understanding of ABI symptoms observed in students post-ABI, in addition to providing educators with strategies that can be implemented for students post-ABI. Quantitative pilot testing of TeachABI revealed that the completion of the module resulted in improvements in ABI knowledge and confidence among educator participants, that were maintained at 2-months post-training. However, it remains unknown how the completion of the TeachABI module may impact educator understanding of ABI knowledge and the implementation of strategies for students with ABI in the classroom.
Objectives: To examine how the completion of TeachABI impacts educator understanding of implementing ABI-specific knowledge and strategies for students with ABI in the classroom.
Methods: 29 participants fluent in English, and either working as a certified educator in Ontario or enrolled in an Ontario Teacher's College program participated in this study. Throughout pilot testing, participants completed the TeachABI module and then participated in semi-structured exit interview via Zoom. A deductive content analysis approach was used whereby the Theoretical Domains Framework (TDF) was the guiding theory to identify key concepts during the coding of initial categories. Data that could not be categorized into pre-existing categories within the TDF were also identified throughout the analysis.
Results: Common themes that emerged throughout participant interviews included knowledge of ABI (i.e., reinforcing previous knowledge, and new knowledge of ABI and ABI strategies), beliefs about educator capabilities (i.e., increased confidence following module completion), environmental and social facilitators and barriers to implementing ABI strategies (i.e., number of students in the classroom, physical classroom space, resources available through the school and/or school board, school team, etc.). In addition to TDF domains, general module feedback and implementation of TeachABI feedback were coded as additional themes emerging throughout interviews.
Discussion: The results highlight educators' increased confidence and understanding of ABI knowledge and strategies to implement within the classroom. The results demonstrate that TeachABI is an effective tool for increasing ABI-specific knowledge and strategies for educators. The module feedback has been implemented into future iterations of TeachABI. Future research should trial the implementation of TeachABI into the hospital to return to school pathways for students post-ABI in addition to creating pathways for educator completion of TeachABI across Ontario schools.

419 Employing a Dummy Head Surrogate to Validate High-Speed Video Analysis for a Mild Traumatic Brain Injury Mouse Model

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ABSTRACT

Mild traumatic brain injuries (mTBI) remain a critical area of research, particularly in understanding their mechanisms and effects on various populations. While established data collection methods such as mouthguard- and helmet-based sensors are prevalent in human studies, these techniques are not applicable in mice research due to the anatomical constraints and low mass of mouse heads. Our lab has worked in collaboration with the Neuroscience department at Western to create a novel humane mTBI mouse model which utilizes high-speeding imaging to capture video footage of impacts for subsequent analysis. Through high-speed video analysis, we derived key engineering properties but needed to ensure the accuracy of our findings. To facilitate the investigation, we utilized a dummy head surrogate equipped with a DTS 6DX PRO-A accelerometer, enabling direct comparison between sensor data and video analysis results. The dummy head, constructed at a 50-percentile scale, was positioned vertically on a raised platform and subjected to free fall from approximately 20 cm onto a cushioned testing surface, allowing for both anterior and posterior impact assessments. A total of 11 video analyses were conducted, comprising 5 anterior and 6 posterior impacts. The sensor data were analyzed over the full duration of the impact, while the video analysis focused specifically on the initial contact between the hybrid head and the floor. The analysis encompassed a total duration of 250 ms, with the impact occurring at the midpoint of this time interval. The data underwent comprehensive analysis, including comparisons between raw sensor data and various filtering techniques aimed at enhancing accuracy by mitigating noise. Preliminary results indicate that the raw rotational velocity data exhibited the lowest accuracy difference at 2.72%, while the Median and Wavelet denoising filters produced accuracy differences of 2.89% and 6.47%, respectively. These results suggest that our image-analysis approach can effectively capture head kinematics in a mouse mTBI model. Future research will focus on refining our methodology by exploring additional filtering techniques and examining a broader range of impact scenarios to further enhance data reliability and applicability.

420 Endoscopic Approach for Traumatic CSF Leak Repair in an Adult Using Free Flap Reconstruction from the Anterolateral Thigh After Failed Nasoseptal Flap Repair

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ABSTRACT

Recurrent cerebrospinal fluid (CSF) leaks in adults, especially after failed nasoseptal flap repair, pose significant challenges. This case report highlights the successful repair of a recurrent CSF leak using a minimally invasive endoscopic approach with free flap reconstruction from the anterolateral thigh (ALT), combined with neck dissection for vessel anastomosis. This technique was selected because the patient and the family refused transcranial surgery due to concerns over its risks.

Case Description: A 47-year-old patient presented with a recurrent CSF leak after a failed nasoseptal flap repair. The patient, eligible for transcranial surgery, declined the procedure. Consequently, a free flap from the anterolateral thigh was chosen due to its flexibility and appropriate surface area for covering the defect.

Surgical Technique: The endoscopic approach began with evaluation of the nasal cavity and skull base to locate the recurrent leak and assess the previous repair site. A free flap was harvested from the anterolateral thigh, and a neck dissection exposed recipient vessels, specifically branches of the external carotid artery. The flap was introduced through a transmaxillary approach and positioned over the defect. Microvascular anastomosis connected the flap's vessels to recipient neck vessels, with intraoperative Doppler confirming blood flow and viability.

Outcomes and Conclusion: The patient's recovery was uneventful, with no signs of leakage on follow-up imaging. This approach minimized disruption to surrounding tissues and avoided complications associated with transcranial surgery, providing a successful and less invasive alternative for recurrent CSF leak management.

Relevance for the World Congress on Brain Injury: This case presents a new endoscopic technique for treating complex skull base defects, relevant to professionals managing traumatic brain injuries. It offers a less invasive solution for patients refusing or unsuitable for traditional transcranial approaches.

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421 helping the Helpers: An Update on Current Service Developments and Resources

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ABSTRACT

Background: Until very recently, the intersection of intimate partner violence (IPV) and brain injury (BI) has been almost entirely overlooked in research, practice, and policy, despite the known risks associated with the two conditions. Globally, one in three women will experience IPV in their lifetime. Physical violence during IPV can cause neurological deficits, loss of consciousness, and BIs, both through blows to the face, head, and neck, and through non-fatal strangulation. Individually, BI and IPV are associated with elevated rates of unemployment, poverty, and homelessness, as well as increased risk of mental health challenges and addictions. A general lack of IPV-BI awareness, gaps in screening, and unique barriers to healthcare and social service provision leave many survivors undiagnosed and/or unaware of their BI, further complicating identification and support. Additional complications are embedded in professional siloing and a lack of interdisciplinary cross-pollination, misdiagnosis, and the lack of IPV-BI sensitive services. To date, there has been limited research identifying barriers and facilitators to IPV-BI support, and very few available practice resources, despite an identified need. The researchers here have been working to address this gap and will report on the current state of knowledge, while sharing support resources developed through community-based projects.

Methods: A number of research projects have been undertaken with the goal of producing IPV-BI education and practice resources. Researchers employed qualitative, community-based, participatory methods, and conducted surveys, semi-structured interviews, and focus groups to gather data. These projects explored: (a) service providers knowledge and awareness of IPV-BI, and how to recognize and respond, (b) survivors' and service providers' experiences of IPV-BI services; (c) perceived support needs; (d) existing programs, policies, and practices; and (e) valued characteristics of healthcare and social support services. Participants were recruited from a national informal IPV-BI network, through local, regional, and national women's shelter and brain injury support organizations, or through snowball sampling. University of Toronto, University of British Columbia-Okanagan, and Wilfrid Laurier University Research Ethics Boards granted ethical approvals.

Findings: Researchers used a qualitative, thematic analysis approach, attached descriptive codes, and then grouped findings into broad, topic-oriented categories and identified recommendations for practice resources. Applying a knowledge to action framework, the results were then used to develop multiple resources to support frontline workers and healthcare providers that are freely available via Supporting Survivors of Abuse and Brain Injury through Research (SOAR; www.soarproject.ca) and the Abused and Brain Injured Toolkit (www.abitoolkit.ca).

Conclusion: These projects address critical gaps in understanding the impact of IPV-BI and the resources available to support social service workers and healthcare providers. Many of these resources are the first of their kind globally, and provide practical solutions to better support women exposed to IPV-BI.

422 A Study Protocol for a Randomized Controlled Trial on Combined Robotic Verticalization and Mobilization in Patients With Severe Acquired Brain Injury

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ABSTRACT

Introduction: Upright position recovery (i.e. verticalization) is a crucial step in the rehabilitation of patients with severe acute brain injury (sABI) to prevent complications of prolonged immobilization, regain hemodynamic stability and improve muscular cutaneous trophism and cognitive performance. However, verticalization with traditional tilt table (TV) is frequently complicated by orthostatic hypotension due to blood pooling in the lower limbs and lack of leg movements. Recently, tilt-table equipped with robot-assisted lower limbs cyclic mobilization has been proposed as a safe and suitable device for accelerating the adaptation to vertical posture in bedridden patients with sABI since the acute phase. Verticalization Equipped with Mobilization (VEM) improves venous return and leads to better cardiac output. To date, contrasting and inconclusive effects of VEM on functionality, gait and level of consciousness in patients with sABI have been found.

The present multicentric study (ID: NCT06469983) aims to evaluating the effectiveness of VEM versus TV in a large cohort of patients with sABI.

Methods: According to an a priori power analysis, 198 patients with sABI including both prolonged disorder of consciousness (pDoC) and emerged from pDoC (EpDoC) will be enrolled in 6 post-acute Neurorehabilitation Units and will be randomized to receive either VEM or TV. The protocol includes 5 VEM or TV sessions per week for 4 weeks (20 sessions total). Each session will last 30 minutes. The VEM protocol will involve gradual verticalization on the Erigo® tilt table, which incorporates rhythmic passive movement of the lower limbs. The TV protocol will follow the same gradual verticalization approach using a traditional standing device. Patients' clinical-motor-functional findings will be assessed by the following measures at study entry, after 5-week treatment and after 1 month. Additional neurophysiological data and blood biomarkers will be recorded at the same time points. Statistical analyses will be conducted blind, according to the intention-to-treat principle.

Outcomes and Measures: 1. Primary Outcome: level of consciousness in pDoC by Coma Recovery-Scale revised, cognitive functioning in EpDoC by Level of Cognitive Functioning. Secondary outcomes: spasticity by Modified Ashworth Scale, limbs movements by Medical Research Council scale in EpDoC and reflex movement responses to nociceptive stimulation in pDoC, disability by Disability Rating Scale and modified Barthel Index, professionals' devices' usability by System Usability Scale. Daily sessions will be monitored using the Adverse Events Report, the Agitated Behavior Scale for EpDoC, and the Nociception Coma Scale for pDoC. This work was supported by the Italian Ministry of Research, under the complementary actions to the NRRP "Fit4MedRob - Fit for Medical Robotics" Grant #NC0000007).

Conclusions: Data collection will start in November 2024. The preliminary data will be analyzed and presented at the Congress. This trial aims to provide new insights into the effectiveness of VEM in sABI rehabilitation.

423 Re-Imagining Public Health: Exploring a Community Partnership Approach to Addressing Intimate Partner Violence Related Brain Injury

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ABSTRACT

The intersection of intimate partner violence (IPV) and brain injury (BI) has been nearly completely overlooked in research, practice, and policy, despite the known risk associated with the two conditions. The majority of physical injuries sustained by women as a result of IPV are from battery to the head, face, and neck, including strangulation. In the IPV context, an external force, such as blunt force trauma to the head or face or violent shaking is enough to sustain neurological deficits. The lack of research on the intersection of IPV-related BI (IPV-BI) makes for limited understanding of survivor's healthcare needs and a scarcity of services tailored to their needs. With one in three women expected to experience intimate partner violence (IPV) in their lifetime, and up to 75% of those women incurring suspected brain injuries, IPV-BI is a significant public health concern. Along with increased risk of mental health challenges, addictions, and complex health needs, IPV and BI are also associated with elevated rates of unemployment, poverty, and homelessness. These physical and social determinants of health impact women and can leave them vulnerable to ongoing violence and permanent disability. The intersection of IPV-BI is uniquely and extraordinarily complex. Each component individually presents significant challenges on multiple fronts: medically, emotionally, psychologically, economically, and socially. This complexity presents singular challenges to the development and delivery of effective, timely healthcare and social service supports. Since COVID-19, healthcare systems have experienced unprecedented strain resulting in longer wait times, fewer services available, and an inability to address the complex needs of survivors of IPV-BI, particularly in rural and remote communities. Seeking alternative approaches to addressing these gaps is of critical importance. Collaborations between knowledge producers, community-based service providers from diverse geographical areas, advocacy groups, and

volunteer organizations can be one such approach. Presented here is an example of how this approach can be effective. Engaging in a community-driven collaboration with the goal of providing research expertise and knowledge support to the Canadian Royal Purple Society, the ongoing project has resulted in the development of a national campaign to address IPV-BI including public awareness events, funding and donation programs, policy impacts, and the development of blueprints for community capacity building to support and prevent IPV-BI. This ongoing project addresses a critical gap in addressing the impact of IPV-BI on survivors on both an individual and a community level. Presented here is an innovative grassroots approach to addressing the unique care needs of survivors of IPV-BI while building capacity at a local level. This talk is intended to provide insights, resources, and practical suggestions for fostering community collaborations, involve the volunteer, and work together to better support women exposed to IPV-BI.

424 how Do You Implement Care Pathways? Lessons from the Neurotrauma Care Pathways Initiative

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ABSTRACT

Background: There are no evidence-based standardized neurotrauma care pathways implemented at the healthcare system level that provide expert-informed guidance related to care and service provision from time of injury to life in the community, while considering the social determinants of health. Engaging diverse key partners, the Neurotrauma Care Pathways developed Ideal Care Pathways for traumatic brain injuries (TBI; mild/concussion and moderate to severe). The TBI Care Pathways address known gaps in care related to, for example, unclear expectations during patient journeys, non-standardized concussion identification, and the much-needed lifelong community supports, especially related to mental health. With the Pathways, including Quality Indicators, at hand, momentum needs to be built to address these care gaps. Objective: to describe the implementation plan and outcomes for the TBI Care Pathways.

Methods: As part of the development of the Ideal Care Pathways and companion Quality Indicators, regional teams were identified to champion the implementation of priority aspects of the TBI Care Pathway. The implementation strategy consisted of several components: catalyst grants for the regional teams with implementation support; collaboration with regional Acquired Brain Injury System Navigators; engagement of healthcare funders in Quality Indicator collection; audit and feedback through Report Cards; and creation of policy briefs. Each implementation project was co-designed with persons with lived experience (PWLE) and their families and grounded in the principles of implementation science. Quality Indicator collection was facilitated.

Results: Implementation priorities were established and included two common priorities across the province: education for PWLE and their families, and care coordination and navigation. Six formal pilot implementation projects have been completed and the resulting care maps, implementation manuals, sustainability plans and project-specific evaluation data are publicly available online. Implementation projects addressed navigation, PTSD, primary care checklists, Well Being and key acute care clinical practices. Audit and feedback reports have been produced that characterize publicly funded and insurance funded care. Additional priorities have been added to improve Care Pathways to better support older persons after TBI and those with mental health challenges. Current projects involve the scale and spread of original projects, implementation of Quality Indicators in both publicly funded and insurance funded care, building awareness among funders of the inefficiencies and ineffectiveness of current TBI Care and piloting of new models of integrated multidisciplinary primary care. Implementation and knowledge mobilization results relevant to clinicians, healthcare planners and funders will be presented.

Conclusions: These evidence-based Ideal Care Pathways represent a road map for quality improvement with a strong emphasis on community care, transitions and proactive chronic care management. This work represents the initial steps of the journey towards ensuring that all persons living with TBI and their families receive equitable care and supports to address their chronic needs over the lifespan.

425 Does use of Robotic Gait Trainer Impact the Trajectory of Emergence in Disorders of Consciousness? Preliminary Data from a Single-Site Retrospective Study

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ABSTRACT

Background: While individuals with Disorders of Consciousness (DoC) arising from a severe traumatic brain injury (TBI) benefit from comprehensive multidisciplinary inpatient rehabilitation, only limited evidence is available to

guide optimal interventions to improve consciousness (Murtaugh et al, 2024). Robotic devices offer a novel approach for efficiently integrating ingredients often emphasized for neurologic recovery including mass repetition, cardiovascular exercise, and sensory stimulation. However integration of robotics is often delayed until later stages of recovery (Burnfield et al, 2021). While feasible (William et al, 2020), there is a gap in research examining robotics' impact on changes in consciousness during inpatient post-TBI rehabilitation. The purpose of our retrospective study was to examine and compare changes in DoC of adults undergoing inpatient rehabilitation following a severe TBI who did and did not engage in a robotic gait intervention.

Methods: Following Institutional Review Board approval, electronic health records of inpatients cared for between 7/1/2017 and 7/15/2024 were reviewed to identify English-speaking adults with a primary diagnosis of TBI resulting in DoC who underwent serial assessment using the Coma Recovery Scale-Revised (CRS-R). Individuals with SCI were excluded. Relevant data were extracted manually and validated. Descriptive and comparative statistics, including independent and paired t-tests (or non-parametric equivalents) were performed (SigmaPlot 11.0; significance, $p < 0.05$; average mean values reported).

Results: Use of robotic gait (i.e., Lokomat) training was determined on an individual basis by each patient's clinical team. The Robotic group (n= 32), on average initiated device training 43.6 days (SD= 26.9) post-admission and completed an average of 12.4 (SD= 12.6) Robotic gait sessions, lasting 23.2 minutes (SD= 12.6), for a total usage time of 293.2 minutes (SD= 335.4). The No-Robotic group (n=65) received conventional multidisciplinary therapy without gait robotics. Robotic and No-Robotic cohorts did not vary significantly in age (39.9 vs. 41.0 years, respectively), gender (72% vs 77%), or initial CRS-R score (7.6 vs. 9.3 points). Length of stay was longer for the Robotic vs. No-Robotic group (127.7 vs. 81.4 days; $p = 0.008$). Both groups significantly increased CRS-R scores from initial to final assessment ($p < 0.001$); however, the overall improvement in CRS-R scores from initial to final assessment was greater for the Robotic vs. No-Robotic group (9.5 vs. 6.7; $p = 0.022$). The Robotic and No-Robotic groups did not differ significantly in the number of returns to acute care (0.7 vs. 0.4 events).

Discussion: Not unexpectedly, both groups evidenced significant improvements in CRS-R scores across their stay. However, improvements were greater for those who engaged in mobilization on the Robotic and risk (i.e., return to acute care) was not significantly heightened. Future, randomized controlled trials are needed to discern whether these differences persist when factors such as medical co-morbidities, medications, injury severity and time since injury are controlled.

426 The Invisible Injury: How Psychosocial Outcomes May be Differentially Impacted by Visible Indicators of msTBI

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ABSTRACT

Over 40% of individuals who experience moderate-severe traumatic brain injury (msTBI) continue to experience lifelong challenges and adjustment to their psychological, cognitive, social, and physical well-being[1]. TBI is unique in that accompanying disability may not always be overtly visible, adding to the misconceptions of injury[2]. Physical indicators of injury following TBI can include scars or differences in balance or gait, though numerous other indicators of injury are far less obvious, which include changes in cognition, mood, and motivation[3,4]. Most research focuses on the psychosocial impact of TBI when the injury is "invisible"[5-7]. Fewer research exists which directly compares the impact of visible indicators of injury on psychosocial functioning and growth.

We analyzed data from a mixed-methods pilot study exploring change in health, identity, and well-being among 40 individuals with msTBI, of which n = 24 endorsed visible indicators of injury and n = 11 endorsed identified as someone with a disability. Outcomes included functional recovery (GOSE9), self-rated recovery, community enfranchisement (CPI), quality of life (QOLIBRI), social support (ISEL-12), mental health symptoms (GAD-2, PHQ-2, PC-PTSD), event centrality (CES-7), coping styles (Brief COPE), and posttraumatic growth (PTGI).

When assessed independently, GOSE9, self-rated recovery, CPI-participation importance scores were lower for those with visible indicators and disability identity compared to those without. CES-7 scores were marginally higher for both groups (ps = .055). Those with visible indicators reported significantly lower ISEL-12, PTGI-Relating to Others subscale and PHQ-2 scores, whereas those with disability identity reported lower GAD-2 scores only. When identity variables were combined and evaluated using ANOVA, results revealed that individuals with visible injury and disability identity (n = 10) reported significantly lower GOSE9 and self-rated recovery

compared to those without visible injury and without disability identity (n = 14). Further, those with visible injury and disability identity reported lower ISEL-12-Belonging and PTGI-Relating to Others scores compared to those without visible injury, regardless of disability identity (n = 16). Qualitatively-derived themes regarding change and growth following injury were summarized for each identity group to highlight contextual factors around a) functional recovery and b) social connection and relationships.

TBI is often considered an "invisible injury" relative to other lifelong conditions[8]. However, the public stigma and its associated negative impact on survivors' psychosocial functioning and growth are just as profound[9]. Results provide initial evidence of the importance of identity variables in the functional and psychosocial well-being of individuals following msTBI. Understanding how visible indicators (or lack thereof) of msTBI may drive perceived stigma among individuals and their social network would be paramount to promoting social well-being, connection[10], and positive disability identity development[11].

427 Adjustment following Traumatic Brain Injury: Resilience and Posttraumatic Growth

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ABSTRACT

Background: Traumatic brain injury (TBI) is associated with cognitive, emotional, and functional sequelae. The ability to maintain psychological stability under stress is often described as resilience (Masten et al., 2021) whereas posttraumatic growth (PTG) is defined by positive psychological changes following adversity (Tedeschi et al., 2018) and both may be implicated in adjustment and recovery following TBI, yet their roles in neurorehabilitation are under-explored (e.g., Grace et al., 2015; Infurna & Jayawickreme, 2019). We examined resilience and PTG for adults adjusting to TBI and its sequelae.

Methods: A cross-sectional, mixed-methods design was conducted via online survey recruited through social media, healthcare support groups, and rehabilitation clinics. Questionnaires of sociodemographics, health history including TBI and standardized measures of trauma (Trauma Symptom Inventory-2; Core Beliefs Inventory), resilience (Connor-Davidson Resilience Scale), PTG (Posttraumatic Growth Inventory), functional, (Mayo-Portland Adaptability Inventory-4), and psychological outcomes (Symptom Assessment-45 Questionnaire, PTSD Checklist for DSM-5) were completed. Qualitative analyses will be reported elsewhere.

Results: 19% (n = 124; n = 669 screened) reported a history of TBI: at least one mild (n = 67, 54.0% i.e., see Silverberg et al., 2023), moderate (n = 33, 26.6%), or severe TBI (n = 24, 19.4%) with 87% requiring medical assistance (i.e., hospitalization). Leading causes of the TBIs were accidental falls (37.9%), sports-related injuries (15.3%), and motor vehicle collisions (14.5%). The sample (Mage = 52 yrs, SD = 17 yrs) was primarily Caucasian (77.3%), female (74.2%) and had completed postsecondary (82.2%). Analysis of variance (ANOVAs) indicated significant differences across TBI severity groups (mild, moderate, severe) for psychological trauma (CBI: $F(2,121) = 14.34$, $p < .001$; TSI-2: $F(2,121) = 3.50$, $p = .034$), functional outcomes (MPAI-4: $F(2,121) = 17.94$, $p < .001$), and psychological outcomes (PCL-5: $F(2,121) = 7.15$, $p = .001$; SA-45: $F(2,121) = 5.74$, $p = .004$). Tukey HSD analyses demonstrated persons with severe TBI endorsed significantly greater psychological trauma associated with the TBI event (CBI: severe vs. mild, $p < .001$; TSI-2: severe vs. mild, $p = .039$), poorer functional outcomes (MPAI-4: severe vs. moderate, $p < .001$), and greater psychological distress (SA-45: severe vs. mild, $p = .004$; PCL-5: severe vs. mild, $p = .001$) than those with less severe injuries. In line with theories of PTG, individuals with severe TBI endorsed significantly more PTG experience relative to those with mild injuries (PTGI: severe vs. mild, $p < .001$); however, the index of resilience was not found to differ ($p = .654$). This divergence between resilience and PTG may suggest that PTG postinjury is associated with the magnitude of adversity experience (e.g., Godwin et al., 2015) and that enhancing resilience and/or PTG through individualized, targeted interventions fostering positive psychology may enhance recovery for adults adjusting to TBI.

428 Social Determinants of Concussion Incidence in Canada

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ABSTRACT

Background: Social, economic, and systemic factors contribute to health disparities. However, there is relatively little research on these social determinants of health (SDoH) in the context of concussion, particularly in Canada. We aimed to identify the relationships between several SDoHs (i.e., racial/cultural identity, access to primary care, immigration status, and household income) and concussion incidence among adolescents and adults in Canada.

Methods: Data was collected from the Traumatic Brain Injury Rapid Response module of the 2020 Canadian Community Health Survey, administered by Statistics Canada. This is a cross-sectional, national health survey of 18,858 residents aged 12 years and older. Participants were asked whether they sustained a concussion (diagnosed by a medical doctor

or identified by another health professional) in 2019. Respondents were also asked about several SDoH, including their racial or cultural identity, whether they have a regular healthcare provider, country of birth (used for determining immigration status), and their household income.
Results: A total of 245 participants self-reported at least one diagnosed concussion in 2019. In the unadjusted models, respondents who identified as Indigenous were more likely to report 1+ concussions compared to respondents who identified as White (OR=2.21, 95% CI=1.11, 4.39). Participants who identified as non-White were less likely to report having sustained concussion(s) compared to those who identified as White (OR=0.31, 95% CI=0.15, 0.65). Immigration status was also a significant predictor of experiencing concussion(s), with immigrants having reduced odds compared to Canadian-born respondents (OR=0.35, 95% CI=0.19, 0.65). Relative to those earning between $60,000 and $149,999 per year, participants earning >$150,000 were more likely to report having sustained at least one concussion (OR=1.65, 95% CI=1.06, 2.58). In the multivariable model adjusted for age and sex, including all SDoHs as predictors, only cultural group was significantly associated with having sustained concussion(s) in the past year (non-White<White; OR= 0.30, 0.14, 0.64). Having a regular healthcare provider was unrelated to likelihood of reporting at least one diagnosed concussion in both the unadjusted (OR=0.91, 95% CI=0.53, 1.56) and multivariable models (OR=0.84, 95% CI=0.47, 1.52).
Conclusions: Several SDoHs were associated with differences in self-reported diagnosed concussion incidence. Prospective surveillance is needed to confirm these findings. Further research is also necessary to identify the mechanisms underlying SDoH-related differences in concussion risk.

429 Behind the Silence: Factors Affecting Concussion Symptom Reporting from an Athlete's Perspective

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ABSTRACT

Introduction: It is estimated that more than 50% of athletes do not report their concussion symptoms, highlighting a significant issue within the sports community. Since the diagnosis of concussions relies heavily on self-disclosure of symptoms, this practice of under-reporting exposes athletes to an increased risk of future traumatic brain injuries and post-concussion symptoms. Various factors influencing nondisclosure behavior—such as diagnosed concussion history, sex, knowledge levels, and attitudes toward concussions—have been studied, yielding mixed results. Moreover, few studies have employed qualitative methods to explore the experiences of athletes from diverse sports regarding the disclosure process. Utilizing a mixed-methods approach, this study aims to examine the reporting behaviors of university athletes, focusing on their attitudes, knowledge, sex and diagnosed concussion history, while also identifying barriers to reporting among both athletes who choose to disclose or not their concussion symptoms.
Methods: Fifty university student-athletes (32 females and 18 males) who had experienced at least one concussion symptom during a practice or competition were recruited for the study. They completed an online survey that included a modified version of the Rosenbaum Concussion Knowledge and Attitudes Survey-Student Version (RoCKAS-ST), along with open-ended questions
Results: Athletes scored high on the Concussion Knowledge Index (M = 20.7), yet the majority chose not to report their concussion symptoms (n = 39/50). Those who under-reported tended to have less favorable attitudes toward concussions, which were significantly related to their reporting behaviors. Female athletes exhibited more favorable attitudes toward concussions; however, no sex-based differences were observed for knowledge levels. Qualitative analysis revealed several key motivations for non-disclosure, including minimization of symptoms, negative repercussions, lack of agency, athletic culture, and knowledge. Additionally, some athletes cited the concussion protocol as a reason for their reluctance to disclose symptoms. In contrast, athletes who reported their symptoms had a more positive view of the reporting process compared to those who did not, stating they would all be willing to disclose their symptoms again if confronted with a similar situation.
Conclusions: A significant number of athletes did not disclose their concussion symptoms. Qualitative analysis identified several barriers to disclosure, including a negative perception of the concussion protocol, offering a novel contribution to the existing literature. On the contrary, athletes who disclosed their symptoms expressed satisfaction with the care they received and held a positive view of the concussion protocol. This implies that non-disclosing athletes may have misconceptions about the protocol, underscoring the need for educational programs to address and clarify these misunderstandings. Future studies should investigate

individual factors that may predict reporting behaviors among athletes. The role of each athlete's engagement in their recovery process should also be considered.

430 Sleep's Role in Mild TBI Symptom Recovery: Unlocking the Potential of Sleep Hygiene Interventions

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ABSTRACT

Background: Sleep disturbances are a common issue following mild traumatic brain injury (TBI), both in the acute phase (0-4 weeks post-injury) and the chronic phase (1-3 months post-injury). Given the strong connection between sleep and overall health, these disturbances may slow down or worsen the recovery of post-concussive symptoms. Although addressing sleep issues seems essential, it is unclear which individuals are most likely to benefit from targeted interventions.

Aim: This study aimed to explore the relationship between sleep-wake patterns and the recovery of post-concussive symptoms during both the acute and chronic phases of mild TBI. Additionally, it sought to assess the feasibility and acceptability of a sleep hygiene intervention for individuals experiencing ongoing symptoms in the chronic phase.

Methods: The study included 56 adult participants (aged 18-64) who had been diagnosed with mild TBI and were recruited shortly after being seen in the emergency department of a level I trauma center. Participants wore a wrist actigraph for 7 consecutive days and nights to monitor their 24-hour activity-rest cycles during both the acute and chronic phases. They also kept a sleep diary and completed self-reported questionnaires on sleep quality (Pittsburgh Sleep Quality Index, PSQI) and post-concussive symptoms (Rivermead Post-Concussion Questionnaire, RPQ) at both phases. After the second assessment, participants with a PSQI score indicating significant sleep disruptions (≥ 5) were offered a sleep hygiene intervention. This intervention consisted of a 90-minute educational session to create a personalized sleep plan, followed by two weeks of psychosocial support via phone calls. A follow-up assessment was conducted after the intervention.

Results: The average total sleep duration was 7 hours and 7 minutes in the acute phase and 6 hours and 47 minutes in the chronic phase. However, 41% of participants in the acute phase and 49% in the chronic phase slept less than the recommended minimum of 7 hours. Perceived sleep quality indicated impairments in 88% of participants during the acute phase and 77% during the chronic phase. Poor sleep quality was associated with higher post-concussion symptom levels in both phases (r=0.361 at one month, r=0.474 at three months, p<.01). While actigraphy data did not show significant associations with symptom levels in the acute phase, in the chronic phase, total sleep time was significantly correlated with symptom levels (r=0.319, p<.05). Of the 29 eligible participants, 16 completed the intervention, and 50% showed a ≥ 20% improvement in their PSQI scores. Non-responders had significantly higher post-concussion symptoms compared to responders (p<.001).

Significance: This study underscores that many adults do not meet recommended sleep duration following a mild TBI and that poor sleep quality is linked to higher symptom levels. A sleep hygiene intervention may be beneficial for individuals with mild to moderate symptoms.

432 Development of the Calgary Adapted aRm Ergometer (CARE) Exertion Test: A Physiological Alternative to the Calgary Concussion Cycle Test

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ABSTRACT

Background: Aerobic exercise testing post-concussion identifies functional deficits and facilitates exercise recommendations promoting clinical recovery. Despite its effectiveness for rehabilitation, no validated post-concussion exercise test

sensitive to the functional limitations of Para-athletes currently exists.
Objectives: To develop an incremental post-concussion exercise test using arm crank ergometry [Calgary Adapted aRm Ergometer (CARE) Test] with comparable cerebrovascular and systemic physiological responses to the Calgary Concussion Cycle Test (CCCT) in able-bodied adults.
Methods: Twenty participants (age 18-51;10F,10M) completed the CARE Test and CCCT to volitional fatigue in randomized order. Middle cerebral artery velocity (MCAv), heart rate (HR), mean arterial pressure (MAP), and partial pressure of end-tidal carbon dioxide ($PETCO_2$) were measured throughout both tests. Mean differences were compared at baseline, 25, 50, 75 and 100 percent of test completion. Data were normalized to test duration to account for differences between tests. Intraclass correlation (ICC) and Cohen's d effect sizes were calculated to assess agreement and reliability between tests.
Results: The mean difference in HR between the CCCT and CARE Test progressively increased with exercise intensity, ranging from 2 bpm ($p = 0.45$) to 8 bpm ($p < 0.05$) at 25% and 100% test completion respectively. Reliability for HR was moderate across all intensity levels (ICC), with effect sizes ranging from negligible to medium. MCAv mean differences increased with intensity, ranging from 1.50cm/s at 25% test completion ($p = 0.45$) to 5.37cm/s at 100% test completion ($p < 0.05$). Reliability for MCAv was good and effect sizes remained negligible to small. MAP differences between the tests remained stable, ranging from 4.05 mmHg at 25% test completion ($p = 0.11$) to 4.83 mmHg at 100% test completion ($p = 0.076$), with moderate reliability and small effect size. Mean difference in $PETCO_2$ increased steadily until 75% test completion (2.39 to 4.93 Torr, $p < 0.05$). $PETCO_2$ reliability was moderate to good with medium to large effect size. At 100% test completion, the $PETCO_2$ difference of 2.00 Torr was considered a small effect size.
Conclusions: Despite large muscle mass differences between the upper and lower body, the CARE Test represents a promising alternative to the CCCT, demonstrating moderate physiological comparability across measured variables. Importantly, MCAv displayed good reliability between tests. Impairments in MCAv regulation are associated with concussion and the development of novel exercise tests for concussion rehabilitation must consider the cerebrovascular response. Differences in HR and $PETCO_2$ emerged at higher intensities, suggesting a robust physiological response to high intensity exercise exists for both upper and lower body modalities. The development of the CARE Test advances concussion rehabilitation strategies with a cerebrovascular focus towards Para-athletes. Future studies will assess the CARE Test in adolescents and Para-athletes with lower-limb limitations to promote accessible clinical exercise prescription following concussion.

433 Psychiatric Complications After Traumatic Intracranial Hemorrhage: The HEAD Helsinki Study

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ABSTRACT

Background: The extent of psychiatric complications after head injury are not well recognized. We assessed the prevalence and treatment of psychiatric symptoms after traumatic intracranial hemorrhage (tICH) in a 10-years follow-up.
Methods: An observational, retrospective single-center cohort of consecutive tICH patients from HEAD Helsinki (Head trauma related health care Economics, Acute care and Development of long-term outcomes in Helsinki city region) study hospitalized at Helsinki University Hospital between 01 January and 31 December 2010. We reported primary outcomes as psychiatric symptoms and their subsequent treatment on secondary level psychiatry during the follow-up period 01 January 2010 and 31 December 2019. Logistic regression analysis was performed to study association between clinical aspects and primary outcomes.
Results: In our cohort of 385 patients (mean age 60.7 years, 66.5% male) with tICH, 66 (17.1%) had any psychiatric symptoms, and 48 (72.1%) of them experienced new symptoms (median time to onset 25 months), of which 26 (54.2%) were without any psychiatric history prior to tICH. A total of 35 patients (53.0%) received at least secondary psychiatric care, and 40 (60.6%) patients had initiated new psychotropics (median time to initiation 8 months). Compared to patients without psychiatric symptoms during the follow-up period, patients with psychiatric symptoms were younger (mean 49.1 years vs. 63.1 years, $p < 0.001$) and had less frequently larger (101-200 ml) intracranial hemorrhages (9.1% vs. 25.7%, $p = 0.003$). In multivariable analyses, younger age and epidural hemorrhage were independently associated with the development of psychiatric symptoms. Prior psychiatric medication and lower admission GCS score were associated with consequent psychiatric treatment.
Conclusions: Every sixth patient in our cohort had psychiatric symptoms after tICH. Over half of them received secondary

level psychiatric care indicating the severity of psychiatric complications.

434 Social Support and Concussion: Exploring The Experiences Of Youth Facing Barriers

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ABSTRACT

Background: Social support is a process whereby an individual exchanges resources with another to enhance their well-being. This exchange can help support a positive recovery from a concussion by mitigating psychological and psychosocial symptoms related to the injury. However, the health benefits of social support are dependent on the recipient's appraisal of support, which is influenced by demographic, socio-economic, and geographical factors. Youth facing barriers to positive development includes youth who may require additional supports to reach their full potential (e.g., racialized, low income). Their perspectives regarding desired social support are currently unknown and may differ from those previously described in the literature who do not experience similar life circumstances.

Purpose: The purpose of the study was to explore the experiences of youth facing barriers to positive development who have sustained a concussion to develop a detailed and rich understanding about what constitutes meaningful social support during concussion recovery.

Methods: The study used an interpretive phenomenological methodology and operated within a constructivist paradigm that adhered to a relativist ontology and a subjectivist/transactional epistemology. Four participants aged 13 to 18 years who experienced a concussion during high school and that self-identify as a youth facing barriers to positive development were recruited. Data were collected via in-person or virtual one-on-one interviews, comprising demographic and rapport building questions, a concentric circle activity, and semi-structured interview questions. Interviews were analyzed using interpretive phenomenological analysis.

Results: Through analysis, four overarching themes were co-created regarding what constitutes meaningful social support to the participants of the study during their concussion recovery. Participants of the study expressed how they valued social support that helped them preserve their independence, allowed them to retain their identity following their injury and that which made them feel less emotionally and physically isolated. They also highlighted the importance of adult figures within their recovery that provided them with dependable support that prioritized their health in occasions where they did not want to. Participants outlined how meaningful social support included that which addressed and negated the challenges they faced during the recovery from their injury. Whereas social interactions that perpetuated these challenges were understood as negative or harmful to their recovery.

Significance: This investigation provides a better understanding of participants' experiences of receiving social support during concussion recovery. The findings of the study provide insight into aspects of meaningful social support regarding who it is delivered by and why certain forms are valued over others. Findings highlight the importance of matching provided social support following a concussion injury to the needs and wants of the individual. It also provides insight into how effective social support may be provided to individuals who experience similar life circumstances to the participants of the study.

435 Preliminary Service Mapping for Women Victims of Intimate Partner Violence with Possible Traumatic Brain Injury Identifies Important Gaps

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ABSTRACT

Introduction: Intimate Partner Violence (IPV) is a global public health and public safety issue. The World Health Organization estimates that approximately one in three women worldwide experiences IPV. Among victims of physical IPV, it is estimated that up to 75% also suffer from traumatic brain injury (TBI) due to blows to the head. Despite the high prevalence of both IPV and TBI, their intersection is often overlooked, leading to a lack of screening for possible TBI within IPV services and possible IPV within TBI services, siloed service provision, and inadequate care for women victims of TBI secondary to IPV. This study aimed to map the first points of contact for women survivors of IPV and potential TBI across various service providers in Montreal, Quebec, Canada, and to assess the level of collaboration between TBI and IPV services.

Methods: This study is the first phase of a multi-step, community-based participatory research project. In this phase, a law student and an occupational therapy student conducted field observations and guided individual interviews with professionals from key service providers, including the Montreal police force (SPVM), Juripop (accessible legal services), Crime Victims Assistance Center, Côté Cour (social work

services for IPV cases in the criminal justice system), Alliance MH2 (second-stage shelters for women and children victims of IPV), and healthcare professionals specialized in TBI. The findings were synthesized and analyzed according to Lévesque's (2013) framework of accessibility to care, with a focus on service communication, collaboration, and appropriateness.
Results: Preliminary findings indicate several entry points to IPV services in Montreal. However, there appears to be variability in the extent to which these services are accessible to this population. Moreover, existing entry points do not always provide or lead to the person receiving all necessary services, nor are they consistently referred to other essential resources. Results also show the limited interconnection between service sectors with initial points of contact within the justice system not screening for TBI nor referring to TBI services. Likewise, TBI-focused services lack specific expertise in addressing the needs of women victims of IPV. Further, we found a relative absence of health/rehabilitation and community-based services targeting the needs of this population with double vulnerability.
Conclusion: Considering the high prevalence of IPV-related TBI, it is essential to foster collaboration across all service sectors to provide more integrated, accessible, and patient-centered care for this vulnerable population. Enhanced cross-sector collaboration, including the health-rehabilitation system, and targeted training on the intersection of IPV and TBI is crucial to ensuring comprehensive support for survivors and establishing an integrated and adapted ecosystem of care for survivors.

436 Relationship Between Severity of Post-Concussive Symptoms and Motor Learning in Patients with Mild Traumatic Brain Injury

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ABSTRACT

Individuals with mild traumatic brain injury (mTBI) can suffer from persistent (i.e., over 4 weeks after injury) post-concussive symptoms (PPCS) in about 30% of cases. PPCS affect various functional domains and are commonly evaluated using the Rivermead Post-Concussion Symptoms Questionnaire (RPQ), a self-report symptom rating scale evaluating the presence (cut-off score ≥16) and severity (total score 64) of PPCS. Motor learning reflects synaptic plasticity supported by excitatory (long-term potentiation) and inhibitory (long-term depression) mechanisms and is crucial for various daily tasks. It has shown to be decreased in patients and athletes following mTBI as compared to healthy controls. However, the potential interplay between PPCS and motor learning impairments remains scarcely investigated. The objective of this study is to quantify the relationship between PPCS severity and motor learning impairments in a subpopulation of patients diagnosed with mTBI through an institutional care pathway. Implicit motor learning was assessed using the serial reaction time test (SRTT), a computerized bimanual finger-tapping task using block sequences. After removing outliers, two learning indexes were computed for the dominant hand: the total training-related learning ((median reaction time of the first sequence block – median reaction of the last sequence block) / median reaction time of the first sequence block), reflecting both motor and sequence learning and; the sequence-specific learning ((median reaction time of the last sequence block – median RT of the last random block) / median reaction time of the last sequence block), reflecting sequence-specific knowledge only. These indices were correlated with RPQ scores using Pearson correlations. We included 18 participants (mean ± SD age: 39.0 ± 13.4 years, 12 females, median [IQR] time since injury: 90.5 [127.8] days). Their RPQ scores was 32.3 ± 12.8; 15 participants were above the PPCS threshold. Regarding motor learning, the mean group reaction time was 707.0 ± 214.3 ms for all sequence and random blocks (accuracy: 94.0 ± 4.4 %). The total training-related learning index was 7.3 ±10.2 % while the sequence-specific learning index was -8.6 ± 9.8 %. There was no significant correlation between RPQ scores and the total training-related learning index (r= 0.01, p=0.96) neither between RPQ scores and the sequence-specific learning index (r=0.48, p=0.052). This preliminary analysis suggests an absence of relationship between motor learning and PPCS severity, which could reflect the specificity of a motor learning assessment versus global information processing impairments (i.e., presence of implicit motor learning alterations in the absence of other neuropsychological problems). These findings would need to be confirmed on a larger sample that includes control participants. This currently ongoing work (a priori sample size estimation: 75 participants) will contribute to disentangling clinical and subclinical effects of mild traumatic brain injury and its impact on specific functions, such as motor learning.

438 Integrating Occupational Therapy in Second Stage Shelters for Women Victims of Intimate Partner Violence and Traumatic Brain Injury

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ABSTRACT

Introduction: According to the World Health Organization, one in three women worldwide will experience physical or

sexual violence in their lifetime. In Canada, among women victims of intimate partner violence (IPV), 42% suffer physical injuries, most commonly to the head and neck. These women are at high risk of traumatic brain injury (TBI) which remains undiagnosed and untreated, limiting access to essential care. The main objectives of this project were to describe an initial experience of integrating occupational therapy (OT) student placements in shelters for women victims of IPV and traumatic brain injury to explore the obstacles encountered as well as potential solutions to overcome them.
Methods: This study adopted a research-intervention approach. Four occupational therapy students participated in a 12-week research internship across four shelters in Quebec, Canada. Workshops and training sessions were provided to both shelter staff and women victims of IPV on the topic of the intersection between IPV and TBI. Students screened women victims of IPV for possible TBI using the HELPS tool. For those with a positive screening, OT services were provided. Each student kept a journal that was later analyzed using qualitative content analysis to identify the obstacles and potential solutions to integrating OT services in women's shelters.
Results: Thirty-four shelter staff members and 47 women survivors of IPV participated in TBI awareness activities. Of the 31 women screened using the HELPS tool,19 (66%) tested positive for possible TBI. Sixteen women received follow-up OT services tailored to each woman's specific needs, focusing on enhancing independence in activities of daily living. Analysis of the students' journals identified five obstacles to integrating OT services: 1) mental health challenges; 2) limited accessibility and availability of women; 3) limited collaboration of survivors during the OT process; 4) risks related to case documentation and women's safety; 5) lack of staff knowledge about TBI and its functional impacts. Proposed solutions included 1) training OT professionals and students on the mental health effects of IPV and TBI; 2) adapting assessment tools to fit the IPV context; 3) offering more flexible service hours and integrating OT professionals into the shelter teams to encourage engagement; and 4) building trust with survivors and establishing clear guidelines for OT care, with additional time allotted to understand each woman's background.
Conclusions: This project provided valuable insights into the challenges of integrating OT TBI services in shelters for women affected by IPV. It underscored the importance of collaboration between shelter staff and OT professionals and highlighted the need for specialized care for TBI. The findings lay the groundwork for future efforts to improve the quality of care for women survivors of IPV and TBI, with further collaborations anticipated to address ongoing needs.

439 Developing a Roadmap for Managing Traumatic Brain Injury: Transforming Insights from the Lived Experience to an Educational Resource

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ABSTRACT

Advances in traumatic brain injury (TBI) research have greatly improved our understanding of the long-term impacts on cognitive function, decision-making, and independence. As TBI is being considered a chronic condition, there is a growing need for resources that empower individuals with TBI to manage its long-term effects. In response to this, the NYU Langone Rusk Rehabilitation Traumatic Brain Injury Model System (RRTBIMS) conducted a five-year mixed-methods study to explore how individuals with TBI navigated their condition from the time of injury to the present. Participants reflected on the causes of their injury and the barriers and facilitators they encountered in understanding and managing TBI. These insights informed the development of a comprehensive "roadmap" designed to support individuals in managing TBI as a chronic condition. The study employed the Framework Analysis method to systematically code and analyze data from semi-structured interviews, identifying recurrent themes related to the lived experience of TBI. High-frequency themes were prioritized to guide the content of educational materials. Informed by these findings, a simplified version of the Intervention Mapping (IM) framework was utilized to develop specific performance objectives and messaging for the educational toolkit.
Design: Qualitative study.
Setting: Community and referral-based outreach in urban setting.
Participants: 22 individuals with TBI (interviews); 8 feedback survey respondents.
Results: The educational toolkit produced through this study consists of 39 chapters, grouped into five key areas: TBI effects, TBI as an invisible injury, TBI and relationships, independence and living with the injury, and resource navigation. Each chapter underwent a comprehensive review process, incorporating feedback from expert stakeholders. Additionally, community stakeholders reviewed the developed content for relevance, readability, look, and feel. Among survey respondents (N=8), the majority were female (62.5%) and included individuals with TBI (50%), care partners (12.5%), and healthcare professionals (37.5%). All respondents rated the quality of the educational materials as Good or Excellent, with 62.5% reporting the resources were easy to navigate. Feedback also indicated areas for future improvement, with 57.1% of respondents identifying gaps in content related to overdose and employment concerns. During this presentation, the toolkit will be described and feedback via written and/or web-based survey will be requested to improve the relevance of the toolkit to different populations, and increase distribution to individuals with TBI.
Conclusions: This study demonstrates the efficacy of utilizing qualitative data from individuals with TBI to inform the development of educational resources that address the complexities of managing TBI as a chronic condition. By integrating qualitative data directly from TBI survivors, this roadmap offers a consumer-driven, practical resource tailored to the needs of those affected by TBI. The iterative design process ensures that these materials remain both practical and responsive to

community needs, positioning them as valuable resources for ongoing TBI management.

440 Results from Prospective Studies of Mild Traumatic Brain Injury May Not Generalize to Patients Seeking Treatment for Persisting Post-Concussion Symptoms

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ABSTRACT

Objective: To compare characteristics of patients referred for treatment of persistent postconcussion symptoms (PPCS) with those of research subjects, followed in a prospective study of mTBI, who developed PPCS.

Methods: The sample included 198 people between the ages of 18 and 60 years with PPCS, selected from two studies, including 92 from a prospective study of individuals followed from the emergency department (ED) ("prospective ED sample"), and 106 from a study of patients referred to a hospital-based rehabilitation clinic ("clinical rehabilitation sample"). The prospective ED sample included individuals presenting at the municipal ED or the university hospital in Trondheim with mTBI from April 2014 to December 2015, and a proportion of these later developed PPCS (measured at 3- or 12-months following injury). Participants in the clinical rehabilitation sample were treatment seeking persons referred to specialized health care, from September 2019 to April 2023, with post-concussion symptoms. Data from these participants were collected from the initial clinical interview 3-18 months after injury. PPCS was defined as British Columbia Post-Concussion Symptom Inventory (BC-PSI) scores ≥13 or reporting at least three moderate or severe symptoms, and/or Rivermead Postconcussion Symptom Questionnaire (RPQ) scores ≥ 12. Functional global outcome, work/school participation, resilience, and presence of fatigue were examined.

Results: Among the clinical rehabilitation sample, 43% did not meet the World Health Organization mTBI Task Force criteria and were conceptualized as having "possible mTBI." Forty-one percent of the participants in the clinical rehabilitation sample had only seen their general practitioner, and not presented to any ED. More patients from the clinical rehabilitation sample had not returned to work/school after injury (43%) than in the prospective ED sample (18%), had a significantly higher total RPQ score (30 vs. 17, $p<0.001$) and significantly greater number of monthly headache days ($p<0.001$). Individuals from the clinical rehabilitation sample had a significantly lower GOSE score than individuals from the prospective ED sample (median score 6 vs. 7, $p<0.001$). There was also evidence of lower resilience among individuals in the clinical rehabilitation sample.

Conclusions: MTBI patients with PPCS from a prospective research study differ in clinically important ways from treatment seeking patients with PPCS referred for specialized health care. The treatment seeking patients have milder injuries, yet more symptoms, worse functional outcome, and lower resilience. Results from prospective studies of patients with mTBI may not be generalizable to patients seeking treatment for PPCS.

441 Co-creation and Content Development of a Novel Serious Video Game for Enhancing Adolescent Socio-Moral Reasoning

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ABSTRACT

Background: Traumatic brain injury (TBI) is prevalent among children and adolescents, with wide-ranging negative impacts on their cognitive, physical, social, family, and behavioral functioning. Extensive research has documented the adverse effects of pediatric TBI on social functioning specifically. Studies have shown that TBI can disrupt overall social competence, including reduced social participation and impaired interactions and friendships. Additionally, emerging research suggests that children and adolescents with TBI may be at higher risk for socially maladaptive or risky behaviors and may struggle with socio-moral reasoning (SMR). SMR is an important social-cognitive skill that refers to the ability to analyze and evaluate social situations in the light of moral criteria in order to make judgments about right and wrong and regulate behavior. As such, the sound development of SMR promotes the establishment of healthy social behaviors and positive interpersonal interactions, while regulating and inhibiting the emergence of socially inappropriate behaviors. It is therefore vital to be able to document and enhance young people's SMR skills in order to identify any potential difficulties and remediate social difficulties before they infringe on social relationships and quality of life. However, few

assessment and intervention tools exist to quantify or qualify SMR in young people, and most existing measures are limited by poor ecological validity, outdated scenarios, and unengaging presentation modalities for contemporary tech-savvy youth, thus limiting engagement and motivation. OBJECTIVE: This study documents the co-creation design phase and content development process of an innovative technosocial tool for youth who sustain TBI, aimed at addressing SMR assessment and intervention challenges through a novel serious video game.
Design: Stages of developing a novel serious video game are described, from its theoretical grounding in neuropsychology and social neurosciences to its practical development based on multi-sectorial expertise and testing with relevant focus groups. Analysis of qualitative data from the co-creation process involving researchers, industry partners, and diverse user groups are presented through focus groups and iterative design processes to ensure the game's alignment with adolescents' interests, learning styles, and motivators. The content development phase consisted of a literature review and expert panel consultations. Results from initial testing ("game play tests") indicate that the game shows promise as an engaging and effective tool for assessing and enhancing SMR in adolescents, with potential applications in both research and clinical settings for addressing social cognitive deficits after pediatric TBI
The Significance: To ensure a robust development process, the rationale underlying the multi-step creation and design, format choices and content development are discussed alongside their associated strengths, limitations, opportunities, and challenges and to ensure greater replicability in social cognitive task development.

442 Pre-injury And Baseline Psychological Symptoms In Caregivers Of Patients With Moderate To Severe TBI

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ABSTRACT

Background: Traumatic brain injury (TBI) represents a significant health concern globally, as it may result in temporary or long-lasting impairments following an external mechanical force to the brain. In the United States alone, there are approximately 1.7 million TBIs annually, leading to about 50,000 deaths. Patients who sustain a moderate or severe TBI (msTBI) usually require admission to an ICU, are unable to make their own healthcare decisions, and require the assistance of a family or friend caregiver. These caregivers are often untrained and are under tremendous stress from their loved one's injury. Approximately one-third of these caregivers may develop long-term anxiety and depression. CG-WELL is an ongoing randomized controlled trial comparing a novel web and phone-based intervention to standard of care. The intervention includes an overview of TBI education, coping and problem-solving skills, online modules and monthly tailored follow-up phone calls to address common unmet caregiver needs that last throughout the first six months after injury. The purpose of this analysis is to compare baseline and pre-injury BSI-18 scores which reflect anxiety and depressive symptoms, and to understand factors associated with higher differences from baseline.
Methods: Participants were caregivers of patients who had sustained msTBI within the past two weeks. We obtained a BSI-18 baseline at the time of enrollment, and caregivers were queried as to how they might have responded to BSI-18 questions two weeks prior to their loved one's injury. We evaluated the impacts of socioeconomic factors such race, caregiver education level, caregiver relationship and sex of the caregiver on BSI-18 scores.
Results: Of 78 caregivers included in this analysis, the average age was 51 years old, 76% were female,19% were male, 13% were black and 87% were non-black. Overall, caregivers had higher BSI-18 scores at baseline compared to how they may have responded two weeks prior. Mean preinjury BSI-18 scores were 4.1 and increased by 8.3 with a baseline mean of 12.7, indicating worse depressive and anxiety symptoms. Female caregivers had higher BSI-18 change score than males with an average difference of 3.83 (95% CI -10.10, 2.43). Black caregivers reported a worse change when compared to their nonblack caregiver counterparts [BSI-18 difference of 3.78 (-4.32, 11.87)]. Caregivers with education greater than high school were had higher BSI-18 scores compared to those with less education 1.23 (-4.21, 6.67).
Conclusions: Caregivers have a significant increase in BSI-18 scores following a loved one's msTBI, reflecting the severity of depressive and anxiety symptoms. This change was worst in females, blacks, and caregivers with higher levels of education. Clinicians caring for patients with msTBI should be mindful of the substantial anxiety and depressive symptoms caregivers experience.

444 The Role of Peer Experiences in the Development of Behavior Problems after Pediatric Mild Traumatic Brain Injury

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ABSTRACT

Background: Increased behavior problems have previously been reported in children following a mild traumatic brain injury (mTBI). A possible risk factor for this may be the child's social environment: while the influence of parental factors has been

investigated, the role of peer behavior after mTBI remains largely unknown. We investigate if negative peer experiences in the form of perpetration or victimization are associated with the development of behavior problems after mTBI.
Methods: From the Adolescent Brain and Cognitive Development (ABCD) study, we included children who reported an mTBI between the baseline assessment (pre-injury, 9-10 years) and 2-year follow-up (post-injury, 11-12 years) and compared them to the remaining sample without a history of injury (nmTBI = 192, nControl = 3198). First, we examined group differences in post-injury behavior problems (CBCL – parent-report questionnaire) as well as in perpetrator or victim experiences with peers (PEQ – self-report questionnaire). Second, we investigated whether the two kinds of peer experiences would moderate the development of behavior problems following mTBI.
Results: Children with an mTBI within the past 2 years showed higher post-injury behavior problems than controls ($p = .006$), even when controlling for pre-injury levels. They experienced higher levels of victimization by peers ($p = .004$) but did not report more perpetrator behavior ($p = .864$). Perpetrator behavior was predictive of behavior problems ($p < .001$) but did not moderate the relationship with mTBI. Victim experiences, however, moderated the relationship between mTBI and the development of problem behavior ($p < .001$).
Conclusion: Following an mTBI, children showed higher behavior problems and reported more victim experiences than children without mTBI. Victim experiences acted as a mediator, suggesting that children who experience aggression from their peers may be especially at risk for behavior problems after mTBI. Perpetrator behavior, on the other hand, was strongly related to behavior problems independently of mTBI. This suggests that a child's peer environment may be an important factor for worse behavioral outcomes after pediatric mTBI.

446 "A Whole Ball Of All-Togetherness": A Qualitative Exploration Of Survivor And Provider Perspectives On The Interwoven Experiences Of Intimate Partner Violence, Brain Injury, And Mental Health And Implications For Care

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ABSTRACT

Background: Global estimates suggest one in three women will experience intimate partner violence (IPV). Recent Canadian statistics suggest IPV impacts 44% of Canadian women. Physical violence from IPV is often concentrated on the head, face, and neck, including strangulation, which puts survivors at high risk of both traumatic and hypoxic brain injury (BI). Independently, both BI and IPV have significant and long-lasting impacts, including an elevated risk of mental health challenges (MH). A recent scoping review exploring the intersection of these concerns identified higher rates of MH among IPV survivors with BI than those without yet noted a dearth of research exploring these experiences and their impacts on care. This research addressed this noted gap.
Methods: Interpretive description methodology, involving semi-structured individual and group interviews, explored two research questions:
1) What are the BI- and MH-related needs and experiences of IPV survivors?
2) What are barriers and facilitators to providing/receiving appropriate care for IPV survivors with BI and MH concerns?
24 participants (aged 18+) were recruited across Canada using purposeful sampling. Participants included women survivors of IPV (n=6), executive directors/program managers (n=5), frontline workers (n=7), and employers (n=6). Interviews were conducted in English via Zoom, lasted approximately 60-90 minutes, and were audio recorded. Recordings were transcribed by a professional transcription service, quality checked by the research team, and analyzed using reflexive thematic analysis as described by Braun and Clarke. Andersen's Behavioural Model of Health Service Use helped guide the analysis.
Findings: Several themes were developed through thematic analysis, reported in two published manuscripts. Survivors spoke of IPV, BI, and MH as a "whole big ball of all-togetherness" that had impacts far beyond their relationship. They shared that finding appropriate care was like a full-time job and emphasized the importance of connecting to other survivors. Providers noted the importance of recognizing all three facets of a survivor's experience (IPV, BI, MH) to provide better support. They emphasized the need for flexibility and a "toolbox full of strategies" to support survivors, as well as the benefits of connecting and collaborating across sectors to address challenges outside of their own expertise. Findings were used to develop a mental health module on the Abused and Brain Injured Toolkit (www.abitoolkit.ca/supporting-survivors/mental-health-and-brain-injury/) and actionable recommendations for providers.
Conclusions: This project addresses a critical gap in understanding the impact of IPV, BI, and MH on healthcare-related

needs and experiences. It is the first investigation of its kind in Canada, and among the first globally, providing insights, resources, and practical solutions to better support IPV survivors with BI and MH.

449 Implementing a Multidisciplinary TBI Telehealth Clinic within the VA Healthcare System: Feasibility, Acceptability, and Usability

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ABSTRACT

Background: Persisting symptoms following TBI can vary across individuals, and treatment is often complicated by multiple medical and psychological comorbidities. Multidisciplinary teams composed of specialists in TBI care are among the most effective for holistically managing these complex symptoms. Within the Veteran Affairs System of Care, all combat Veterans are screened for TBI and, those with positive screens are referred to specialty providers. However, access to specialty TBI providers is often limited by factors including availability of services, locality, and disability status. Telehealth models have been proposed as a solution to many of these barriers. However, more work is needed to determine whether a telehealth model of multidisciplinary TBI care for Veterans is feasible. This project sought to determine the feasibility, acceptability, and usability of a multidisciplinary TBI telehealth clinical model at the VA Hudson Valley Healthcare System (VA HVHCS).

Methods: The VA HVHCS was awarded funding by the VA Office of Rural Health to establish a multidisciplinary telehealth TBI program aimed at addressing gaps in specialty TBI care. The VA HVHCS team consisted of three TBI providers, two speech therapists, one psychologist, and a TBI clinical coordinator. Patients were referred via interfacility consults (from other VA facilities) or internally. Patients connected with providers from their personal devices via a secure telehealth interface. Initial evaluation included history of present illness, a targeted physical exam, completion of the Neurobehavioral Symptom Inventory (NSI), and development of an individualized care plan. Each patient also completed a Patient Satisfaction Survey (PSS). Feasibility will be measured based on clinical metrics such as the number of referrals, completed consults, referrals to treatment, no-show rate, and the ease of appointment scheduling (from the PSS). Acceptability is defined here as how satisfied patients were with their treatment (based on relevant PSS questions), and usability will be based on reported satisfaction with the telehealth interface (based on relevant PSS questions).

Results: Between fiscal year (FY) 2022 and FY24, the TBI/Telehealth Clinic received 2,891 total referrals, 2,490 of which were interfacility consults, and 401 were from VA HVHCS. Data analysis related to the PSS and other feasibility metrics are currently being compiled and analyzed by our team. It is expected that these data will be available for presentation by Spring 2025.

Conclusions: This project reports on an innovative approach to TBI care that may be translated nationally across VA if found to be feasible, acceptable, and usable by patients. Translating this telehealth model nationwide would provide a crucial alternative to standard of care and fill an important gap for Veterans with limited access to specialty care.

451 A Portrait of the Housing Situation of People with Traumatic Brain injuries in Quebec

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ABSTRACT

Introduction: Access to suitable housing is a key determinant of health. Individuals with traumatic brain injuries (TBI) have specific and unique housing needs that are often unmet, placing them at risk of experiencing housing instability. It is important to gain a better understanding of their housing reality to provide housing options that meet the needs of people with TBI and promote their housing stability.

Objectives: To provide a portrait of the housing situation of people with TBI in Quebec (Canada).

Methods: This descriptive study is conducted in collaboration with Connexion TCC.QC, which brings together 13 regional community organizations providing services to people with TBI. A questionnaire documenting the current housing situation (e.g., type of housing, housing costs, support and services received) and past housing situation (e.g., types and number of housing situations experienced) was developed with the partner. The data collection tools included a sociodemographic questionnaire, an adapted version of the Residential Environmental Satisfaction Scale (RESS), and the Identification of Risk for Residential Instability and Homelessness Tool (IRIS). To participate in the study, participants had to be aged 18 or older and live with the impacts of a moderate or severe TBI for at least 5 years. Participants were recruited with the support of the organizations, via their social media, during activities offered by the organizations, and through reference from professionals. Descriptive statistics were performed on the collected data.

Results: One hundred participants with an average age of 51.9 years (SD = 14.0) were recruited from nine administrative regions of Quebec. Most of the participants were men (66%) and lived in an apartment or condo (37%), a house (36%), or a residence for seniors (8%). On average, participants have lived in 2.8 different places since the onset of their TBI (SD = 2.8). Based on the IRIS screening, 4% of participants were in an

unstable housing situation. The majority of participants were generally satisfied with their current housing (82%), particularly with the practicality of their home's layout (81%) and its maintenance (86%). When asked about their intention to move, 16% of the participants indicated that they did not plan to remain in their current housing in the next two to three years.
Conclusion: Housing situations vary greatly from one person to another. For some people, their current housing may not fully meet their specific needs. This study results could guide the development of innovations to better address the housing needs of individuals with TBI.

452 how Does TBI Impact Aging? Evaluating Care Quality, Equity, and Healthcare Utilization for Older Adults with TBI

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ABSTRACT

Introduction: Traumatic brain injury (TBI) is a significant public health concern resulting in hospitalizations, morbidity and mortality globally. While it is well-established that older adults are at high risk of sustaining a TBI and are vulnerable to its effects, there is a dearth of research on the impact of TBI on healthy aging. Limited outcome data exist at the population level to evaluate care quality and equity for people aging with this injury.
Objective: To study the impact of TBI on aging and healthcare utilization by implementing Quality Indicators that examine TBI care quality and equity for 1) people who were injured as an older adult (i.e., 65 years or older at time of injury; cohort 1) and 2) people who were injured at a younger age and have aged with their injury (cohort 2).
Methods: Provincial administrative health services data from publicly funded healthcare databases were used. 13 Quality Indicators were co-developed with healthcare partners and persons with lived experience to measure care quality for both target populations. A variety of data were collected for cohort 1 (2016-2022), including, risk-adjusted incidence and mortality rates, healthcare utilization, admission to rehabilitation, primary care follow-up, and rate of discharge by disposition (e.g., long-term care). For cohort 2, mortality and healthcare utilization data were analyzed for a 10-year period (2012-2022) and hard-matching was applied to compare data between cases and controls. Quality Indicator performance was explored using sociodemographic variables such as age group, sex, geographic region, and income.
Results: For cohort 1, the incidence rate for all severities of TBI increased with age. Older adults were more likely to be admitted to general rehab than specialized TBI rehab (8.35% vs 3.04% for persons with moderate to severe TBI). Emergency visit rates in years 1 and 2 increased with age (156.8 per 100 PY in 80+ age group vs. 114.9 per 100 PY in 65-79 years age). The rate of fall-related healthcare usage in the first two years after moderate-severe TBI was also higher among elderly people (43.7 per 100 PY in 80+ age group vs. 30.6 per 100 PY in 65–79-year group). For the matched cohort, cause of injury and admission to rehab significantly influenced survival probability. People who sustained their injury by falling had the lowest survival probability; people with TBI who received inpatient rehab had higher survival probability than those who did not.
Conclusion: This work establishes a foundation for quality-of-care assessments and monitoring disparity in care for older adults with TBI at a population level, while examining the impact of aging with TBI on mortality and healthcare utilization. Ensuring that older people receive appropriate rehabilitation and support to reduce falls is necessary to maintain independence in the community.

453 Auditory Steady-State Responses in Prolonged Disorders of Consciousness: A Diagnostic Approach

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ABSTRACT

Introduction: Prolonged disorders of consciousness (pDOC) remain a significant diagnostic challenge. Assessment based on behavioral responses and symptoms is often ambiguous and prone to error. Analysis of brain activity offers a way to extend the scope of diagnostic tools, providing better insight into the neurocognitive capacity of pDOC patients. In the present study, we introduce an approach based on perturbation of brain activity using auditory steady-state responses (ASSR), which are frequency-domain responses to auditory periodic stimulation. Through a series of experiments, we show evidence that these responses may help to differentiate between pDOC patients with and without awareness.
Methods: We conducted three experiments using different types of periodic auditory stimulation: Constant frequency 40 hz stimulation (CFS), Variable frequency stimulation in the narrow band of 25-55 hz (NBS), Variable stimulation in the broad band of 30-100 hz (WBS). We measured averaged intertrial phase clustering/phase-locking index (ITPC/PLI) from frontocentral channels. The study included pDOC patients with diagnoses of Unresponsive Wakefulness Syndrome (UWS), Minimally Conscious State (MCS-/+), and emergent from the Minimally Conscious State (eMCS). PDOC diagnosis was assessed through repeated Coma Recovery Scale-Revised (CRS-R) administration, with the most frequent diagnosis treated as final. The integrity of the auditory pathway

was tested using otoacoustic emissions and auditory brainstem responses.
Results: To maintain balanced group sizes, we compared responses between two groups: Unaware pDOC group (UWS diagnosis), and aware pDOC group (MCS-/+ and eMCS diagnoses). For the CFS condition, we observed significantly stronger responses in the aware pDOC group. A similar pattern, although less systematic, was observed for NBS and WBS stimulation. In all cases, the response around 40 hz frequency was most sensitive to group differences.
Conclusion: Our results provide evidence that the ASSR protocol shows promise as a tool to support clinical diagnostic methods based on behavioral responses for patients with prolonged disorders of consciousness.

455 Improved Emotion Recognition and Gaze Behaviour Following the Multifaceted, Evidence-Based Rehabilitation Treatment, T-ScEmo, in Patients With Traumatic Brain Injury

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ABSTRACT

Background: The multifaceted and evidence-based rehabilitation treatment T-ScEmo (Treatment for Social cognition and Emotion regulation) is developed for social cognition disorders. Social cognition disorders include, among others, deficits in facial emotion recognition, and are frequently present in patients with Traumatic Brain injury (TBI). A randomised control trial (RCT) has shown T-ScEmo to be effective in improving facial emotion recognition in patients with TBI for at least five months. To date, it is unknown whether this observation of facial affect can be improved in these patients. Therefore, the aim of this study is to investigate if patients' gaze behaviour changes after T-ScEmo.
Methods: The current study included 23 patients with TBI, included according to the protocol of the RCT of Westerhof-Evers et al. (2017) of whom 15 followed T-ScEmo and 8 the control treatment Cogniplus. All patients performed the Eckman-60faces-test (EFT) and the, for this study designed, image-driven, Facial Emotional Recognition Task (FERT) pre- and posttreatment. During the FERT, eye-movements were recorded using a faceLAB™ 5.0. eye-tracker. Pre- and postperformances on the FEEST and FERT were analysed with SPSS paired sample t-tests and group differences with independent sample t-tests and mixed-ANOVA. Eye-tracking was analysed with a Linear Mixed Effect model implemented in iMAP4 in Matlab 2024b, in which contrasts were performed on fixation heatmaps.
Results: Pretreatment T-ScEmo and Cogniplus groups did not differ on EFT nor FERT total scores. Posttreatment, the T-ScEmo group did score significantly higher on EFT (total, anger, fear) and FERT (total, anger, disgust, fear, happiness, sadness, shame, and neutral) than the Cogniplus group ($p < .05$). Interaction effect showed that the T-ScEmo group improved significantly more on FERT-total than the Cogniplus group ($p < .05$). Eye-tracking results showed significant differences in fixation behaviour for pre- versus post T-ScEmo on FERT: anger, disgust, fear, happiness, sadness, shame, contempt, and neutral. Patients showed more fixation to eyes and mouths and significantly less to the middle of the faces after treatment ($p < .05$), while the Cogniplus group remained fixating centrally at the faces.
Discussion: This study shows that patients who received T-ScEmo not only improved in emotion recognition but also changed how patients look at facial affect, as the focus shifts towards eyes and mouth. These results bolster the positive effects of T-ScEmo. Moreover, this pledges for a change in patients' gaze behaviour as a likely mechanism underlying the improved emotion recognition.

456 The Relationship Between Plasma Cytokines and Post-Traumatic Headaches in Patients with Persistent Post-Concussion Syndrome

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ABSTRACT

Background: Concussions have considerable personal and economic consequences. Each year, approximately 40 million people globally, including approximately 450,000 Canadians, will experience a concussion, with up to 30% of them developing persistent post-concussion symptoms (PPCS). Many suffer debilitating symptoms like headaches, dizziness, and cognitive issues, with the most common symptom being post-traumatic headache (PTH). Up to 58% of patients with PPCS will have chronic PTH (cPTH) one year following their injury, experiencing reduced work productivity and quality of life. There is a limited understanding of the underlying pathophysiology of cPTH, and consequently, current treatments often lack efficacy.
Following concussion, a cascade of pathophysiological processes occurs, including alterations to the blood-brain barrier, increased central metabolites and increased inflammatory response. An inflammatory response is essential for appropriate healing, but if maladaptive can lead to protracted recovery, such as in cPTH. Recent studies have suggested a link between PPCS and fluid biomarkers indicative of inflammation and injury in the central nervous system, but the research remains inconclusive. Specifically, cytokines have been shown to be

altered following various conditions, including acute concussion, tension headaches and migraine, although their relationship to cPTH remains unexplored. This research aims to address this critical gap in literature by exploring the relationship between cPTH and various cytokines in individuals with PPCS.
Methods: A total of 47 adults (18-65 years old) with PPCS (> 3 months to 5 years) provided blood samples. Patients scoring > 3 on the headache question on the Rivermead Post Concussion Symptoms Questionnaire were considered to have cPTH. Plasma cytokine levels were measured using a Bio-Plex 200 fluorescence magnetic-bead immunoassay. Linear regression examined the relationships between cPTH and cytokine levels while controlling for sex and age.
Results: When comparing patients with cPTH (> 3 on RPQ) to those without, several cytokine levels showed a significant positive correlation. Including Hu MCP-1 (MCAF) (β = 0.293, 95% Confidence Interval [CI; 0.043, 2.968], p = 0.043), FGF-basic (β = 0.332, CI [1.073, 14.283], p = 0.024), Hu IFN-g (β = 0.291, CI [0.0320, 5.080], p = 0.047), Hu IL-4 (β = 0.309, CI [0.009, 0.306], p = 0.038), Hu IL-7 (β = 0.328, CI [0.237, 3.851], p = 0.028), Hu IL-8 (β = 0.385, CI [0.165, 1.085], p = 0.009), Hu IL-9 (β = 0.321, CI [1.573, 26.288], p = 0.028), Hu IL-12 (p20) (β = 0.332, CI [0.039, 0.543], p = 0.024), Hu IL-16 (β = 0.317, CI [0.168, 1.716], p = 0.018, MIP-1β (β = 0.406, CI [1.065, 5.723], p = 0.005), PDGF-bb (β = 0.428, CI [24.503, 104.637], p = 0.002) and TNF-β (β = 0.318, CI [1.273, 23.564], p = 0.030). Notably, Hu IL-16 was negatively correlated with age (β = -0.332, CI [-0.140, -0.016], p = 0.014). Additionally, Hu TRAIL showed a significant positive correlation with males (β = 0.354, CI [0.917, 7.604], p = 0.031).
Significance: This study found a positive association between several inflammatory cytokines and cPTH in patients with PPCS. These findings suggest potential chronic inflammatory changes with cPTH and could lead to targeted interventions to improve patient outcomes.

458 Affective Clinical Measures Correlate with Connectivity Between Brain Regions Associated with Vestibular Function in Chronic mild Traumatic Brain Injury

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ABSTRACT

Background: Military service members and veterans (SM/V) may be exposed to repeated blasts during service, potentially resulting in traumatic brain injury (TBI). Mild to moderate TBI may result in chronic symptoms such as cognitive and vestibular impairment and affective dysregulation. We correlated affective measures with brain functional connectivity in SM/V with a sentinel blast injury presenting for mild TBI treatment.
Methods: A total 50 male participants including 26 SM/V with blast injury (mean 10.1yr since sentinel injury) and 24 healthy controls participated in this IRB-approved study. SM/V inclusion criteria included self-report of a sentinel blast exposure marking the onset of chronic symptoms. MR imaging was conducted on a 3T Siemens Prismafit MRI with 32-channel head coil. Acquisitions consisted of T1-weighted, 3D-multiecho MPRAGE images with inversion recovery6 and T2*-weighted, simultaneous multislice (SMS)-EPI resting-state functional MRI (rsfMRI, 7min 30sec run). Resting-state functional MRI (rsfMRI) data was subjected to minimal preprocessing in the CONN Toolbox. Multivoxel pattern analysis (MVPA) was conducted to localize voxel clusters which differed in whole-brain connectivity as a function of depression (Beck Depression Index, BDI), anxiety (Beck Anxiety Index, BAI), PTSD (PCL-5 Checklist), and/or vestibular function (Vestibular/Ocular Motor Screening, VOMS) and was followed by ROI-ROI connectome analysis (general linear model) to estimate differences in connectivity among suprathreshold ROIs as a function of group, BDI, BAI, PCL-5, or VOMS.
Results: PCL-5 was correlated with connectivity between prefrontal areas (PFcm and PF complex) and the postcentral somatosensory area 2. BAI was correlated with connectivity between regions associated with vestibular function (primary somatosensory area 3, vestibular nuclei complex, parieto-insula vestibular cortex, PIVC). Both BAI and BDI were correlated with connectivity between the caudal vestibular cingulate area 23 (CSv) and other areas (dorsolateral middle temporal area 37, posterior insular complex, area PFcm, primary somatosensory area 2). VOMS was correlated with vestibular regions (parieto-insular vestibular cortex/OP2, vestibular nuclei complex) and dorsolateral middle temporal area 37.
Discussion: Connectivity between areas associated with cognitive, affective, and vestibular function correlate with clinical measures of anxiety, depression, and PTSD. Regions associated with multisensory processing (PIVC) and perception of self-motion (CSv), shown to correlate with vestibular dysfunction after mTBI, were correlated with BDI and BAI in this chronic SM/V cohort. These findings may contribute to the observed relationship between chronic vestibular symptoms (including after mTBI) and emotional dysregulation and inform strategies for neurorehabilitation.

459 Interventions to Help Adults with Concussion Return to Work: A Systematic Review

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ABSTRACT

Objectives: Clinicians require guidance to aid patients attempting to return to work (RTW) after concussion. This systematic review synthesizes the results of interventions to determine what types of interventions (i.e., early education and intervention, psychological, rehabilitative, interdisciplinary) are effective, and what behavior change techniques (BCTs) are most frequently used and which BCTs are most promising.

Methods: Peer-reviewed adult concussion intervention studies of any design with direct (e.g., RTW status) or indirect RTW (e.g., community integration) measurements were included. Studies were excluded if they reported on populations with less than 100% with a concussion, or were not interventions published in peer-reviewed journals. MEDLINE ALL, PsycINFO, and CINAHL databases were searched for literature published January 2000-end of December 2023. To assess methodological quality, the Downs and Black checklist was used because it is appropriate for the assessment of both randomized and non-randomized studies of health care interventions. A narrative review describes the effectiveness of intervention type. For BCTs, frequency of BCTs used in the experimental conditions is provided. Also, promise ratios were calculated to establish which BCTs are most effective.

Results: 16 documents were included for data extraction. The majority of the studies had an intervention condition and a comparator condition (12/16), sample sizes ranged from 35 (one group studies) to about 80 per group in multi-group studies, the average age per group was about 40, and the studies were well-balanced regarding sex proportions. Psychotherapy, neuropsychological training, vestibular rehabilitation, vision rehabilitation, exercise, compensatory strategies, cognitive training, vocational support, and interpersonal training may be efficacious. The BCT information about health consequences was frequently used in experimental conditions. Effective BCTs were instruction on how to perform the behavior, reduce negative emotions, action planning, information about health consequences, and problem solving.

Discussion: Limitations of this review include heterogeneity regarding study design (e.g., 7 studies did not use randomization, different dosages and follow-up time frames), 11 studies had moderate risk of bias, and some of the interventions were not designed to facilitate RTW, but rather RTW was a secondary measurement outcome. Despite the limitations, this review is the first to explore interventions to help people with concussion to successfully RTW. It is hoped that the promising interventions and intervention components identified are considered by practitioners when working with patients to improve the quality of their lives (PROSPERO: CRD42022384151).

460 Association between History of Repetitive Blast Exposure and Performance on a Measure of Sustained Attention, Working Memory, and Auditory Information Processing Speed

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ABSTRACT

Background: Repetitive blast exposure (RBE) associated with military occupational specialty has received considerable attention following media reports of significant long-term effects of RBE in the military. Recent work has shown interactions between history of blast exposure and increased risk for multiple medical comorbidities, as well as higher levels of involuntary military job loss due to medical reasons. However, given that many blast exposures do not result a traumatic brain injury (TBI), these injuries often go undetected. Clinical (e.g., cognitive) and biological markers of RBE are thus needed to aid in the identification and understanding of symptoms related to RBE. To date such measures have not yet been well-characterized. One clinical measure sensitive to cognitive changes following mild TBI, which is thought to result in a similar clinical presentation to RBE, is the Paced Auditory Serial Addition Test (PASAT). This measure brings together multiple aspects of cognition, including sustained attention, working memory, and auditory information processing speed. History of mTBI has also been associated with a greater rate of PASAT test discontinuation rates compared to controls. However, patterns of performance on the PASAT have not yet been well-characterized for those with a history of RBE. This study aims to determine whether PASAT performance (i.e., pattern of errors [omission versus commission], test discontinuation rate), is associated with RBE history in a sample of US Veterans.

Methods: Data were collected as part of a larger cross-sectional observational study examining multiple outcomes (e.g., biological, psychological, cognitive, neurobehavioral) and other key factors (e.g., Military Occupational Specialty, lifetime TBI history) in a cohort of Veterans with RBE. Cognitive measures relevant to the current study include the Test of Memory

Malingering (TOMM) and PASAT. Primary outcomes for these analyses include the PASAT total score, total omission errors, total commission errors, and test discontinuation rate, and the Blast Ordnance and Occupational Exposure Measure (BOOM) for Self-Reported Lifetime Blast Exposures. Additionally, results from the TOMM will be used to exclude participants with failed performance validity. Other metrics may include scores from the Beck Anxiety Inventory (BAI), Beck Depression Inventory – 2nd Edition (BDI-II), and PTSD Checklist for DSM-5 (PCL-5).
Results: Data collection is currently underway, with 120 participants having completed the study to date. Final participants are expected to complete the protocol by the end of 2024. Data and analyses will be available to present at the meeting.
Conclusions: Results from this study will help to increase our understanding of how best to assess and characterize symptoms related to RBE in clinical settings. These results may also help set the foundation for future research, such as how to develop evidence-based treatments to address persistent clinical symptoms related to RBE.

461 high Intensity Gait Training (HIT) in Individuals with Acquired Brain Injury (ABI) During Inpatient Rehabilitation: A Knowledge Translation Project

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ABSTRACT

Background: Improving walking function after an ABI is the most common goal stated by patients and/or caregivers receiving inpatient physical therapy. Walking function (gait speed or timed distance) is a major predictor of discharge disposition and length of stay during inpatient rehabilitation, falls, quality of life, community mobility and mortality. The Clinical Practice Guideline to Improve Locomotor Function Following Chronic Stroke, Incomplete Spinal Cord Injury and Brain Injury by the Academy of Neurologic Physical Therapy (ANPT)- American Physical Therapy Association strongly recommends that physical therapists provide task-specific walking training at moderate to high cardiovascular intensity (75-85% of maximum heart rate or 60-80% heart rate reserve, Ratings of Perceived Exertion (RPE) scale of ≥14/20). Given the strength of evidence in favor of HIT and the recommendation put forward by the ANPT to provide HIT as a standard of care in neurologic rehabilitation, we conducted a knowledge translation (KT) project at our inpatient rehabilitation center.
Objective: To present the findings of the KT project conducted at two inpatient rehabilitation centers from 2019-2024.
Methods: The Knowledge to Action cycle was the theoretical framework. Fidelity was monitored through monthly audits of all discharged patients with acquired brain injury from November 2021- June 2024. Initial audits (2021-2023) were conducted through manual data extraction on 20% of consecutive patients admitted into the Brain Injury Program excluding patients with behavior and/or weight-bearing limitations. Automated audits in 2024 were conducted from a report generated through the electronic medical record on all patients discharged from the Brain Injury Program. For all audits, patients meeting the following criteria were included: >17 years-old, without a disorder of consciousness, length of stay (LOS)>7 days, with a walking goal at admission. Descriptive statistics were used to analyze the sample and frequency of receiving at least one HIT session (HIT+).
Results: For November 2021, Site 1: n=10, average age=67, LOS= 18, 50% HIT+. Site 2: n=9, average age=68, LOS= 15, 44% HIT+. For June 2024, Site 1: n=76, average age=66, LOS=18, 64% HIT+. Site 2: n=63, average age=71, LOS=17. 37% HIT+.
Discussion: Implementation of a new intervention into clinical practice takes time, process, and a team-based approach. HIT has been implemented at both sites from a starting point of no use of HIT, but at different levels of fidelity (Site 1> Site 2). Shifting the audit from a manual to a more automated process has benefits and disadvantages. Automated audits are quicker and are inclusive of all patients meeting criteria. However, an automated audit cannot account for behavior and weight-bearing restrictions, cardiac history limiting HIT or complex medical histories.
Future Direction: Reassess barriers to implementation, assess patient outcomes for walking function and to develop a plan for sustainability.

462 Using Machine Learning on Resting-State EEG Data: A Reliable Approach for Diagnosis of Disorders of Consciousness?

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ABSTRACT

Prolonged disorders of consciousness (pDOC) encompass several medical syndromes characterized by severe impairment of consciousness. The most frequent causes of pDOC are traumatic brain injury, anoxia, or stroke. Given the high misdiagnosis rate, reaching up to 40% of cases, researchers are actively seeking new approaches to improve clinical diagnosis. Among the emerging methods, electroencephalography (EEG) appears as a promising alternative. In this study, we investigated the differences in EEG power spectra between unaware and aware groups of pDOC patients. The unaware group consisted of patients with Unresponsive Wakefulness Syndrome, and the aware group included patients with Minimally Conscious State Minus and Plus, and those who emerged from Minimally Conscious State. The final diagnosis was reached as the most frequent diagnosis across 5 repeated Coma Recovery Scale-Revised administrations. We modeled the EEG frequency spectra of 42 pDOC patients using the FOOOF (Fitting

Oscillations & One Over F) algorithm. After that, we chose key spectral properties based on the literature and the characteristic signal properties of each pDOC group. To classify the spectra, we implemented supervised machine learning (ML) to assess its potential in facilitating the diagnostic process. Based on the aperiodic component, the central frequency of the peak with the highest amplitude, and the high-to-low frequency ratio, the ML model predicted pDOC syndromes with 77.9% accuracy (AUC = 0.79), with sensitivity equal to 76.5% and specificity of 79.5%. These findings suggest that utilizing ML for EEG power spectrum parameters enables the differentiation of different pDOC syndromes and may play a significant role in future diagnostic approaches for pDOC.

463 Exploring Functional Neural Alterations in Patients with Persistent Post-Concussive Symptoms: Preliminary Results from a Multimodal Study

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ABSTRACT

Concussion represents a public health concern given its incidence and the significant proportion of patients developing persistent post-concussive symptoms (PPCS). While electrophysiology and neuroimaging studies show promise in identifying brain function changes, the pathophysiology of PPCS remains unclear.

This study aims to bridge this gap by integrating behavioral assessments with complementary functional magnetic resonance imaging (fMRI) and high-density electroencephalography (HD-EEG) data in patients with PPCS. By leveraging the strength of both modalities, we hope to achieve a more comprehensive understanding of the neural dynamics underlying PPCS. We plan to include 80 patients diagnosed with a concussion based on medical evaluation and with PPCS as signified by a Rivermead Post-Concussion Symptoms Questionnaire (RPQ) score of 16 or higher.

Our outcome measures included 3T fMRI and 128-channel HD-EEG recordings in patients with PPCS, alongside behavioral assessments encompassing Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Beck Depression Inventory (BDI). The fMRI analyses focused on thalamocortical connectivity, while HD-EEG focused on whole-brain power spectrum and peak frequency analyses. Additionally, RPQ scores were correlated with fMRI findings, with age and sex as covariates. Data from the patient group were compared to an age-matched control cohort who underwent identical examinations. In our preliminary sample, thirty-four patients (9 males, mean age: 39y.±11.4) with PPCS (RPQ: 40.4±12.5) were recruited between 1 to 12 months post-injury (median: 91 days [59–186]). Twenty-five controls (15 males, mean age: 38.7y.±12.8) were also included. Behavioral assessments revealed that, on average, patients scored at or above the clinical thresholds on the BDI (mean ± SD: 17.3±8.7; threshold = 10), PSQI (11.4±3.9; threshold =5), and ESS (median [IQR]: 9 [5.5-14]; threshold = 9). These scores were all significantly higher than those of the control group ($p < 0.001$), which had RPQ (0 [0–2]), BDI (2 [0–4]), ESS (6.5±3.5), and PSQI (4.1±2.3). fMRI results indicated increased connectivity in patients between the left thalamus and precentral gyrus (p-FDR=0.023), as well as between the left ventral anterior nucleus and the lateral occipital cortex (p-FDR<0.001), precentral gyrus (p-FDR<0.001), lingual gyrus (p-FDR=0.006), cuneal cortex (p-FDR=0.027), and postcentral gyrus (p-FDR=0.03). Additionally, RPQ scores showed moderate positive correlations between the right ventral anterior thalamic nucleus and both the intracalcarine cortex (p-FDR=0.007) and lateral occipital cortex (p-FDR=0.032). EEG power spectral analysis suggests a shift towards lower frequencies for patients, who more often showed a main alpha peak closer to the theta range, although this difference was not significant. In contrast, higher frequencies (i.e., beta), were more prominent in controls compared to patients (p=0.015).

These results confirm previously published behavioral patterns of patients with PPCS and further highlight the potential role of thalamocortical dysfunction in PPCS while underscoring the utility of integrating fMRI and HD-EEG in understanding its pathophysiology.

465 The Impact of Early Traumatic Brain Injury on Behavioral Outcomes and Criminality in Incarcerated Males

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ABSTRACT

Background and Objectives: Traumatic Brain Injury (TBI) can lead to cognitive impairments and executive dysfunction, increasing the risk of incarceration and recidivism. TBI in childhood is especially concerning, as it is associated with long-term cognitive and behavioral issues, including memory deficits, attention problems, and behavioral difficulties, which may elevate the risk of criminal behavior. This study aims to examine the relationship between age at first TBI and behavioral outcomes in incarcerated males, with a focus on identifying patterns that could inform interventions to reduce recidivism.

Methods: Cross-sectional data from 108 males with TBI collected as a baseline assessment for a clinical trial. Participants

were recruited 12 months prior to release. The Level of Service Inventory–Revised (LSI-R) is a structured interview for correctional populations used to predict recidivism risk, adjustment, and institutional misconduct.
Results: On average, participants reported more than three injuries with loss of consciousness (LOC). Seventy-one percent of the sample reported more than one TBI with LOC. Most offenders (n=76, 70.4%) reported their first TBI with LOC prior to the age of 18 with 50% (n=54) reporting an injury with LOC prior to the age of 15. Of the 54 participants with LOC prior to age 15, 59% were incarcerated prior to the age of 16 compared to 53% of the participants with LOC occurring after the age of 15. Those with earlier injuries had a higher rate of institutional misconduct (56%) and assault/violence charges (57%) than those with later injuries (44% and 43%) though these differences were not statistically significant. Results of the LSI-R showed that those with LOC before age 15 were significantly less likely to demonstrate acceptance of responsibility for their crime (χ^2= 3.88, p=.049), less likely to show acceptance of their sentence (χ^2= 11.33, p<.001), more likely to have friends involved with crime (χ^2= 4.47, p=.035), and less likely to have successful employment history (χ^2= 4.59, p=.032) than those injured later in life.
Conclusions: This study highlights the significant impact of early traumatic brain injury (TBI) on incarcerated males, particularly those who experienced their first injury before the age of 15. The findings suggest that earlier injuries are associated with increased rates of institutional misconduct and violent behavior, as well as lower levels of accountability and acceptance. Moreover, early TBI was associated with involvement in peer groups with criminal histories and reduced employment success, further hindering reintegration after incarceration. These results emphasize the importance of early intervention and tailored rehabilitation efforts for individuals with a history of TBI, especially in juvenile populations, to potentially reduce the risk of future criminal behavior and improve long-term outcomes. Future research should explore the development of specific coping and treatment strategies for this vulnerable group.

467 Smartphone App–Delivered Mindfulness-Based Intervention for Mild Traumatic Brain Injury in Adolescents: A Feasibility Randomized Controlled Trial

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ABSTRACT

Background: Anxiety and depression symptoms are common after concussion and undermine recovery. Mindfulness-based interventions (MBI) are efficacious in managing distress and may facilitate concussion recovery. In-person MBI are resource-intensive and unable to meet the high demand for services. This barrier could be addressed through a scalable digital therapeutics (DTx) model, such as a DTx-MBI.
Objectives: We assessed the feasibility of a larger randomized control trial (RCT) to evaluate a DTx-MBI targeted to youth with a concussion by evaluating recruitment efficiency, adherence, credibility, and retention.
Methods: This parallel-group RCT includes patients aged 12-17.99 years who presented to a tertiary emergency department or concussion clinic within 7 days of diagnosed concussion and were deemed at risk for slower recovery per the 5P risk score. Eligible participants were randomized to the experimental (early introduction of DTx-MBI) or control (cognitive sham DTx) group. The DTx-MBI is a 4-to-8-week, 8-module custom-made program for youth with concussion. Each standardized psychoeducation or meditation practice is unlocked as participants progress. Participants were encouraged to engage for 10 min/day for > 4 days/week. The sham DTx uses the same main interface but excludes MBI training, offering only the simple math game 2048. Outcomes: Feasibility was assessed using predefined, adapted thresholds from previous feasibility studies, categorized by a traffic light system (green, amber, red) to guide full-scale trial progression. The green zone thresholds were: a) Eligibility: > 40% of participants screened were eligible; b) Recruitment: > 50% of eligible participants were randomized; c) Credibility: > 70% of participants scored above the midpoint on the Credibility and Expectancy Questionnaire at 1-week; d) Retention: > 75% of participants randomized completed the 4-week follow-up assessment; e) Adherence: > 70% of participants completed the requirement of 10 min for > 4 days/week.
Results: Between mid-November 2022 and mid-June 2024, 124/149 (83.2%) youth were eligible, 99/124 (79.8%) were recruited and randomized to either MBI group (n=49, mean ±SD age=15.08±1.60 years, female sex=38.8%) or control group (n=50, mean±SD age=14.97±1.82 years, female sex=40.0%). 62/83 (74.7%) scored above the scale mid-point for credibility, with similar results across groups (MBI group:

75.0%; control group: 74.4%). Retention rates were also comparable, with 89.8% in the MBI group and 90.0% in the control group. Adherence over the 4 weeks was met by 54/99 (54.5%) participants, with 59.2% (amber zone) in the MBI group and 50.0% in the control group (amber zone limit). Adherence was higher in patients who completed the outcome measures (MBI group: 63.6%; control group: 55.6%).
Conclusions: Eligibility, recruitment, credibility and retention have met the green zone thresholds. However, adherence fell within the amber zone, indicating the need for some adjustments. Further analyses will explore factors contributing to lower adherence, aiming to improve it in preparation for the full-scale RCT.

468 Effects of Repeated Head Impacts on Neck Function in Varsity Football Athletes: Exploring Ways to Prevent Concussions

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ABSTRACT

Primary prevention comprises a wide array of strategies to reduce the onset of concussion in contact sport athletes. As such, protective gear, proper sporting techniques, changes to game rule, athlete education and neck strengthening have been pushed forward in the past years in the hope of reducing concussion incidence. It is indeed believed that neck function might play a significant role in athletes engaging in contact sports where repeated head impacts are frequent. If the protective nature of neck function is established, little knowledge exists on the role of repeated head impact on neck function, and how neck function evolves throughout a football season. The aim of this study was 1) to measure repeated head impacts and 2) measure neck function in varsity football athletes throughout a season. A total of 23 university level varsity football athletes (mean age:23±468.12, mean weight (lbs): 236.29 ± 60,92, mean height (cm) : 185.05±6,20) from the University of Montreal team volunteered to participate in the study. Participants wore instrumented mouthguard collecting head impact data (Prevent biometrics) during a total of 8 regular season and 4 playoff games. In addition, participants engaged in cervical function screening (range of motion (ROM), function, and pain) at three-time points (preseason, midseason, postseason). A cumulative total of 2319 head impacts was recorded amongst participants, with participants sustaining on average 132.75±78.17 (range 32-285) head impacts throughout the season; average impact intensity was of 13.2±8.88 g (range 5-91). When performing a repeated measure ANOVA, no assess changes in neck ROM, significant decreases in extension (from 70.41 to 63.97 (p=0.02)) and left lateral flexion (from 58.65 to 51.15 (p=0.001)) were reported from preseason to postseason. No significant changes in neck function and pain across the 3 time points were reported. Spearman's rank correlations were computed to assess the strength of relationship between amount of head impact and 1) neck ROM, 2) neck function and, 3) neck pain. No significant associations were found for all variables. Our study showed that university level varsity football athletes exhibit changes in neck ROM across a sporting season. These results suggest that neck ROM may be affected by the physical demands of football, throughout the short, intense season. Although no significant associations were found between changes in neck function and head impact metrics, it was shown that neck ROM varies during the season, and future studies should inquire whether neck ROM variations, as seen in this study, have an effect on primary concussion prevention.

469 Gender-Based Violence and Traumatic Brain Injury: A Pilot Program for Women Survivors with Cognitive-Communication Disorders

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ABSTRACT

Background: Global evidence indicates that one in three women and girls will experience gender-based violence (GBV) at least once in their lifetime. Additionally, the relationship between gender-based and intimate partner violence (IPV) and traumatic brain injury (TBI) has been well-established. Despite this, access to brain-injury-specific and trauma-informed support for survivors remains limited. Cognitive-communication disorders are a common sequela of TBI, and it is recognized that experiences of trauma can also negatively impact communication. This is of particular importance as communication competence is critical for survivors who are often required to intersect with first responders, police, health care providers, and legal systems. In these settings where effective communication is essential, survivors are frequently misunderstood, can experience stigma, and, in some cases, face unbelief. With funding from the Public Health Agency of Canada to WomenatthecentrE, a cognitive-communication rehabilitation program was developed and implemented as part of a larger initiative entitled 'Cross-Sectoral Solutions: Strengthening community capacity to address the 'parallel pandemic' of gender-based violence-related brain injury through a survivor-led support program.
Aim: This novel program aimed to provide trauma-responsive cognitive-communication support and intervention to women survivors of GBV with TBI. An additional aim was to build capacity regarding GBV, TBI and communication among speech-language pathology trainees.

Methods: An eight-week novel group intervention program was developed and implemented by a senior speech language pathologist-clinician scientist along with two graduate speech language pathology students. The program involved weekly sessions of 90 minutes, delivered both in a virtual format and in-person to allow for maximum participation. The group size ranged from 4 to 8 participants, with 20 participants in total. The program consisted of education regarding TBI and communication, the impact of trauma on communication, strategies for managing cognitive-communication disorders, as well as an adaptation of Nonviolent Communication: A Language of Life (NVC; Rosenberg M, 2015), and the implementation of breathwork. Objectives for each session were clearly outlined, homework was provided each week for practice, and participants were sent therapy materials in advance of each session. Participants were invited to provide anonymous feedback after each session, and suggestions were incorporated in real-time for subsequent sessions.
Results: The program was generally very well received by participants, who were also considered experts and co-creators in the process. Participants commented that the program would benefit from being longer than eight weeks, and differences were noted between the in-person and virtual groups. Qualitative feedback supported the value and importance of this comprehensive and trauma-responsive program.
Conclusions: There is a critical need for trauma-responsive rehabilitation programs to address the pandemic of GBV and TBI, as well as to build capacity among rehabilitation clinicians. Considerations, successes, lessons learned, and future directions for scaling up the program will be presented and discussed.

471 Visual Evoked Potentials as a Diagnostic Marker in Chronic Disorders of Consciousness

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ABSTRACT

Background: Neurophysiology is increasingly regaining centrality in diagnosing and managing Disorders of Consciousness (DOCs). Recently, the International Federation of Clinical Neurophysiology recommended a multimodal graded assessment approach for DOCs, integrating electroencephalography (EEG), Evoked Potentials (EPs), and Event-Related Potentials (ERPs). This study explores the potential of predicting diagnosis and etiology based on the persistence of afferent pathways identified through neurophysiological examinations.
Methods: We studied 146 DOC patients (52 females, mean age 50.3 ± 14.1 years). 82 were classified as Vegetative State/Unresponsive Wakefulness Syndrome (VS/UWS) and the remainder as Minimally Conscious State (MCS). Exclusion criteria included pre-existing severe psychiatric or neurological diseases. Etiologies were categorized as Anoxic Brain Injury (ABI), Traumatic Brain Injury (TBI), or OTHER causes. Multimodal EPs and auditory ERPs were used to assess auditory (AUD), somatosensory (SOM), and visual (VIS) responses. More specifically: auditory-Slow Vertex Potentials, Somatosensory EPs, and flash-Visual EPs. Endogenous cognitive responses (COG) were evaluated through MisMatch Negativity and P300. Preservation of each pathway was determined by the presence of a response from at least one side; COG was considered positive if either ERP component was present. Diagnostic group comparisons were made using Chi-Square and Wilcoxon tests (significance level: $p < 0.01$, Bonferroni corrected). We employed a Random Forest model with 5-fold cross-validation to predict diagnosis (VS/UWS vs. MCS) and etiology (ABI, TBI, OTHER), using AUD, SOM, VIS, and COG as variables. Accuracy and variable importance (via Gini's index) were computed, and splitting rules were extracted for interpretability.
Results: The diagnostic groups were homogeneous in sex and age but differed in etiology: ABI (51.2% VS/UWS, 17.18% MCS), TBI (26.8% VS/UWS, 31.25% MCS), and OTHER (22.0% VS/UWS, 50.8% MCS) ($p = 3.46*10^{-4}$). Neurophysiological responses showed AUD in 45.1% VS/UWS, and 71.9% MCS ($p = 0.024$); VIS in 24.4% VS/UWS and 65.6% MCS ($p = 5.7*10^{-3}$); and COG in 17.0% VS/UWS and 66.1% MCS ($p = 1.48*10^{-5}$). Diagnosis was predicted with an accuracy of 67.78% ± 6.97% (chance level: 56.16%). VIS and AUD were the splitting variables for the diagnosis, the patient was classified as MCS in presence of both, while absence of either led to a VS/UWS classification. Etiology prediction had an accuracy of 52.51% ± 9.98% (chance level: 29.40%). For aetiology, the splitting variables were VIS and COG: their absence was associated with ABI; the only presence of VIS to TBI; presence of both, to OTHER.
Conclusion: Hence, the persistence of afferent pathways, and especially the visual one, holds significant informative power. Indeed, the VIS pathway conservation is a strong sign of MCS, while its loss is mainly associated to ABI, correlating with poorer outcomes. Our findings suggest that visual potentials can play a crucial role in guiding clinical decisions regarding DOC prognosis, diagnosis, and management.

472 The Role of Occupational Therapy in Supporting Women Victims of Intimate Partner Violence and Traumatic Brain Injury in Child Protection Contexts

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ABSTRACT

Introduction: Intimate partner violence (IPV) often involves several forms of abuse, including physical violence, which can lead to traumatic brain injury (TBI). For women victims of IPV, TBI can significantly impair their cognitive, emotional, and physical capacities, directly affecting their ability to assume parental responsibilities. Protecting women and their children against violence from their partners requires a multitude of services, including child protection authorities and women's shelters. However, navigating legal systems, particularly those related to child protection, can be daunting for women, particularly when they must also manage the consequences of TBI and the reality of living within a women's shelter. Though occupational therapy (OT) services have the potential of providing crucial services to these women, particularly in addressing their parental roles, few OT services specialized in TBI rehabilitation are provided within the context of women's shelters in Montreal Canada.

Objectives: This study aims to explore the potential role of OT in evaluating and documenting the parenting capacities of women with possible TBI, living within women's shelters, while also considering the potential legal implications of these evaluations in judicial processes.

Methods: This study used a qualitative, descriptive, and exploratory design. Three focus groups were conducted to gather data: one involving occupational therapists (n= 6) with expertise in IPV, TBI, and child protection cases, and the other two with both occupational therapists and legal experts specializing in family law (n=1), criminal justice (n=1), and forensic evaluations (n=1). Staff from local shelters for women (n=2) also participated in all three focus groups. Data were analyzed using thematic analysis, focusing on the challenges and strategies related to supporting the parental roles of women victims of IPV with possible TBI.

Results: Preliminary findings revealed key themes and subthemes that highlight the clinical and legal complexities of these cases. These include : 1) the potential for harm due to incomplete or misinterpreted documentation, influenced by professional mandates and inconsistencies in the interpretation of reports among different professionals; 2) the multifaceted effects of IPV and TBI, which complicate accurate assessments—compounded by factors such as insufficient trauma-informed care education and societal biases affecting professional judgments; 3) strategies to address these challenges, emphasizing the need for trauma-informed approaches that integrate women's coping mechanisms and strengths.

Conclusion: In conclusion, there is a need for an increased offer of TBI-informed OT services in women's shelters and improved documentation of these services, particularly in legal contexts involving child protection. Particular attention needs to be paid to what information is (or is not) included in a report, and how it is documented. This study underscores the importance of multidisciplinary collaboration and continued education in trauma-informed care to reduce harm and enhance the support provided to women victims of IPV and TBI.

473 Driving Fitness Post-Stroke: Validating Neuropsychological Tests and Assessing Visual Attention's Impact on On-Road Performance

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ABSTRACT

Objective: Post-stroke driving fitness is essential for maintaining independence and quality of life, necessitating accurate assessments. With the rising demand for evaluations that reliably predict real-world driving performance, this study aimed to investigate the relationship between neuropsychological test performance and on-road driving ability in stroke patients undergoing a multidisciplinary driving assessment. Visual attention capacity—encompassing selective and divided attention—plays a pivotal role in post-stroke driving, crucial for hazard detection, traffic navigation, and quick decision-making. The study had three objectives: 1) to explore the predictive value of a standardized neuropsychological test battery on driving performance; 2) to validate the Norwegian translation of the P-Drive on-road rating protocol; and 3) to assess a novel computerized test measuring visual attention capacity within a multidisciplinary framework, emphasizing quick yet accurate testing.

Methods: Sixty-three stroke patients (50 men; mean age 59 ± 11 years) participated. Each participant completed a neuropsychological test battery. Of the fifty participants referred for an on-road driving assessment (n = 44), driving ability was evaluated using the Norwegian adaptation of the P-Drive protocol, independently scored by an occupational therapist. The neuropsychological assessments included the Sunnaas Driving Test of Visual Attention and Reaction Time (SDTVART), Mini-Mental State Examination (MMSE), Trail Making Tests A and B, WAIS-IV Coding and Digit Span, D-KEFS Color Word Interference Tests 1-3, Rey Complex Figure Test, Greek Cross 3D copy, and the Clock Drawing Test. Additionally, a computerized test measuring visual attention and reaction time (CTAR) was administered to all participants; however, CTAR results were not included in the multidisciplinary clinical decision regarding driving fitness.

Results: The linear regression model predicting on-road driving performance (P-DRIVE) explained 61% of the variance (Adjusted $R^2 = 0.61$) and was significant ($F(14, 10) = 3.66$, $p = 0.02$). The Spearman correlation between P-DRIVE and the multidisciplinary driving assessment decision (Yes/No) was $r = 0.62$, indicating a moderate positive association. This correlation was statistically significant ($p < 0.001$), based on a sample size of n = 44, supporting the strong validation of the P-Drive protocol. Passing the driving assessment correlated with better on-road driving performance rated with

P-DRIVE, underscoring its relevance in predicting driving ability.
Conclusion: These findings highlight the critical role of targeted neuropsychological assessments in evaluating post-stroke driving fitness. Computerized tests designed for individuals with aphasia provide a standardized evaluation that enhance assessment accuracy. Standardized on-road tests remain the gold standard for measuring driving ability in real-world conditions, paving the way for improved patient outcomes and bolstering road safety, ensuring that stroke survivors can reclaim their independence behind the wheel with confidence.

475 Placebo Response to Sham Repetitive Transcranial Magnetic Stimulation for Persisting Post-Concussion Symptoms following Mild Traumatic Brain Injury

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ABSTRACT

Introduction: Placebo effects are therapeutic benefits in symptoms or overall health generated from the context of receiving treatment rather than the intervention itself. Clinical trials using repetitive transcranial magnetic stimulation (rTMS), a non-invasive neuromodulation technique, have demonstrated substantial placebo responses in participants with depression, obsessive-compulsive disorder, and migraines. This may be related to the intensive procedures and perceived innovation of rTMS driving high therapeutic expectations.
It is postulated that symptoms related to traumatic brain injury (TBI) may be particularly placebo responsive. Small randomized-controlled trials of rTMS as a potential treatment for persisting post-concussion symptoms (PPCS) have offered mixed results. However, there has been limited investigation of placebo response in this patient population and therapeutic context. A greater understanding of placebo response has the potential to improve study design and treatment efficacy in rTMS clinical trials. AIM: To investigate potential factors influencing placebo response as determined by changes in the Rivermead Post-Concussion Questionnaire (RPQ), Generalized Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire-9 (PHQ-9,) following sham rTMS in patients with PPCS. We hypothesize that participants with higher baseline anxiety, successfully blinded to condition, and expecting treatment effects will experience greater placebo response following sham rTMS.
Methods: This analysis used a control cohort nested within a double-blinded randomized controlled trial (NCT04568369). Adults with clinician diagnosed mild TBI and PPCS received 20-sessions of sham rTMS to the left dorsolateral prefrontal cortex. Expectation and blinding questionnaires were administered post-intervention. Outcome measures included PPCS severity, depression, and anxiety. Independent t-tests and Pearson's correlations were used to compare post-intervention outcome changes in those who guessed blinding correctly/incorrectly, had high treatment expectations, or higher baseline anxiety.
Results: Thirty-nine participants (aged 40.3 ± 12.2 years, 67% female) received sham rTMS stimulation and completed the outcome measures. 21/33 (64%) expected treatment to be efficacious and 21/36 (58%) incorrectly guessed they received active rTMS. RPQ ($t(76)=3.051$, $p=0.003$) and GAD-7 ($t(76)=0.283$, $p=0.025$) significantly improved post-sham stimulation, however PHQ-9 did not ($p=0.165$). Participants guessing they received active rTMS had significantly higher baseline PHQ-9 ($t(34)=1.233$, $p=0.020$). Changes in outcome measures were not significantly different between those correctly/incorrectly guessing intervention. Treatment expectations, categorized as no, some, moderate, or high, were correlated with post-intervention change in GAD-7 ($r=0.365$, $p=0.037$) suggesting that participants with no or lower expectations had a greater anxiety placebo response. When dichotomized to minimal (GAD-7 score 0-4), mild (5-9), moderate (10-14), or severe (15-21) anxiety, higher baseline anxiety was correlated with greater improvements in RPQ ($r=-0.332$, $p=0.039$) and PHQ-9 ($r=-0.421$, $p=0.008$).
Conclusion: Our results demonstrate a significant relationship between higher baseline anxiety and lower treatment expectations and placebo response. Larger sample sizes and more sensitive measures are required to further explore relationships between expectancy, blinding, and rTMS placebo response in adults with PPCS.

476 Comparative Analysis of Capillary Microsampling Technologies to Venous Blood Draws in a Healthy Population

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ABSTRACT

Background: Concussion elicits of variety of molecular alterations that reflect ongoing injury and perturbations.

Historically, these alterations have been characterized using venous blood collected through phlebotomy. However, there are significant challenges to this including its perceived invasiveness, and participants apprehension and fear in addition to logistical challenges associated with its collection, processing and storage. As such, microsampling technologies have emerged as a potential tool in place of standard venipuncture for blood collection in research studies, yet still need to be developed and validated, particularly in the context of brain injury.
Purpose: The purpose of this study to examine how two, novel microsampling technologies perform compared to traditional venipuncture.
Methods: This cross-sectional study recruited healthy (i.e., uninjured within the last two weeks) participants ages 18-30 years old with no history of adverse reactions to blood. Demographics and blood screening forms were collected. Peripheral venous blood was drawn using standard phlebotomy techniques and capillary whole blood was collected from two additional devices: 1) a finger prick, and 2) upper arm prick. Inflammatory cytokines and chemokines will be quantitated using a high-multiplex immunoassay platform.
Results: Twenty-eight healthy participants were enrolled in the study (n=14 males, n=14 females). Median and interquartile range of height and weight of participants was 174 (165.75-182.25) cm and 78 (64.5-87.5) kg. Four (15%) participants had a diagnosed learning disability, five (19%) participants had a diagnosed psychiatric disorder, and ten (38%) participants had a history of concussion. Twenty-six participants completed all three blood samples, 2 (8%) experienced adverse reactions one of the blood collection techniques. Most participants preferred the upper arm device device (n=19, 79%) while the remaining (n=5, 21%) preferred the finger prick blood collection device. Concentrations of twenty-one inflammatory cytokines and chemokines will be reported and compared for this study.
Conclusion: Preliminary findings suggest that microsampling technologies can be implemented in a healthy population with minimal adverse outcomes. Among healthy individuals, the upper arm device is the preferred blood collection method for participants. The quantitation of inflammatory biomarkers will provide information regarding the performance of microsampling technologies and how they compare to venipuncture for future application in brain injury.

477 Diagnostic Value of Electrical Brain Responses of Patients With Disorders of Consciousness During Visualization of Positively-Valenced Videos Featuring Acquaintances or Strangers

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ABSTRACT

Introduction: Individuals diagnosed with disorders of consciousness (DOC) after a brain injury represent a huge diagnostic challenge. Recent findings suggest that complementing bedside assessment with neurophysiological sensing and emotionally-valenced meaningful stimuli might contribute to improve diagnosis. This preliminary study examines the reliability of electrical brain responses of patients with DOC to passive stimulation using positively-valenced videos of acquaintances or strangers, with the goal of classifying patients as being in a minimally conscious state (MCS) or with unresponsive wakefulness syndrome (UWS).
Methods: Ten patients in minimally conscious state and 9 patients with unresponsive wakefulness syndrome participated in the study. A block paradigm alternating stimulation blocks, where participants visualized videos with emotional content, and resting blocks, was conducted. The stimuli included 6 videos of an acquaintance of the participants (a relative or friend) and 6 videos of a sex- and age-matched stranger describing positive experiences and traits either of the participants or another person, respectively. Brain activity was recorded using a 32-ch EEG headset. Differential entropy, power, wavelet energy, fuzzy entropy, and permutation entropy were calculated for all frequency bands and electrodes. Linear SVM classifiers were trained to distinguish the diagnosis of the patients. Different models were obtained based on the type of stimuli (videos of an acquaintance or a stranger) and the EEG feature used, all aiming at classifying patients in MCS or with UWS. The performance of the models were compared.
Results: The highest AUROC classification performance was achieved using fuzzy entropy as a feature, with scores of 0.90 ±0.05 for videos of an acquaintance and 0.80±0.06 for videos of a stranger. This was followed by wavelet energy (0.73±0.10 and 0.73±0.04), permutation entropy (0.68±0.04 and 0.66±0.05), differential entropy (0.64±0.03 and 0.59±0.01), and power (0.61±0.04 and 0.61±0.01) for models trained on videos of an acquaintance and a stranger, respectively.
Conclusions: Machine learning models achieved higher performance in classifying patients with DOC as in MCS or with UWS when the models were trained on EEG registers while viewing videos of an acquaintance, compared to videos of a stranger. The largest performance differences between stimuli types were observed with fuzzy entropy and differential entropy. Among all features, models using fuzzy entropy consistently showed the highest performance, regardless of the type of stimulus. The superior diagnostic performance with acquaintance videos suggests the potential diagnostic value of this stimulus type. The diagnostic approach used in this study could be a promising tool to complement DOC diagnosis and warrants further investigation in future research.
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478 Sleep in Subacute Concussion Recovery: Patterns and Predictors of Prolonged Sleep Disturbance: Results from the Toronto Concussion Study

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ABSTRACT

Background: It has been well established that sleep (and wakefulness) change in the acute stage of concussion, with an increased need for sleep which has been hypothesized to be neuroprotective. For most, sleep patterns and sleep need return to pre-injury status with resolution of concussion symptoms. However, it is also well established that at least 30% of individuals go on to experience prolonged sleep disturbances, and that the pattern of sleep for these individuals changes during the post-acute phase. Further, it has also been well established that poor sleep is associated with prolonged concussion recovery. As such, there is a need to identify and understand the factors that may influence the development of long-term sleep disturbances so that these can be targeted for prevention and early intervention.

Aims: To identify patterns of recovery and factors which may be predictive of prolonged sleep disturbance among a cohort of individuals with subacute concussion from the general population. An additional aim was to examine any sex differences in recovery.

Methods: This prospective naturalistic cohort study followed 921 adults aged 17-85 years who were diagnosed with concussion in several hospital emergency departments in Toronto, Canada, who were not admitted to hospital, and who did not have any neurological or positive imaging findings. The Sleep and Concussion Questionnaire (SCQ), Sports Concussion Assessment Tool (SCAT) and Headache Questionnaire were administered at weeks 1, 2, 4, 8, 12 and 16 post-injury.

Results: From weeks two to four post-injury, sleep patterns were observed to evolve from a need for increased sleep, for some, a return toward pre-injury sleep, and for others, to symptoms of insomnia. By week 8, those whose sleep had returned to 'normal' - i.e., to their pre-injury sleep routine, also had lower SCAT scores overall. However, for those whose sleep had not returned to pre-injury status, statistically significant differences by sex were observed, with females experiencing greater symptoms of insomnia ($p<0.01$). Additional associative factors were a history of pre-injury depression ($p<0.01$) and neck pain ($p<0.01$).

Conclusions: The pattern and time frame of sleep and sleep disturbances post-concussion varies. However, based on our findings, risk factors for the development of prolonged sleep disturbances and/or sleep disorders include female sex, neck pain and a pre-morbid history of depression. Identification and treatment of these risk factors may mitigate the development of persistent sleep disorders and prolonged concussion symptoms.

479 Peripheral Stimulations Used as Alpha Power Cerebral Brain Activity Generator

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ABSTRACT

Background: Severe acquired brain injury could lead to disorders of consciousness, a condition often characterized by reduced alpha brain activity among other things. Previous studies have suggested that transcranial alternate current stimulation (tACS) could be a promising technique to increase alpha-band spectral power in humans. However, its clinical application, particularly in intensive care units, poses significant challenges. These include the need for precise brain access, specialized training, and contraindications such as craniectomy or recent seizures. To overcome these limitations, we explored alternative, simpler techniques to improve the alpha spectral power. This study aims to determine which peripheral stimulation technique is most efficient in synchronizing alpha brain activity in healthy subjects.

Methods: A total of 44 healthy participants (i.e.; no prior history of neurological or psychological conditions, upper limb fracture of luxation and hearing deficit, not taking medication with brain effects) were subdivided into two groups of 22 and took part in a crossover study. Group 1 was administered two median nerve stimulation protocols (10.5 hz and 40 hz stimulation frequency) at the right wrist while Group 2 was administered two distinct auditory protocols (binaural beat 400-410Hz sounds and auditory clicks presented at a frequency of 10 hz). The presentation order of the conditions was counterbalanced between subjects. These protocols involved 13 stimulation cycles of 1 min followed by a 30-second rest period during continuous EEG recording. Each protocol was preceded and followed by a resting EEG (3 min eyes open and 3 min eyes closed) (Biosemi, Amsterdam, Netherlands). Tolerability and side effects were recorded.

Results: Group 1 included 22 participants: 30.7 ± 7.1 years old, ratio M:F 11:11, and 3 left-handed. Group 2 included 22 participants: 30.7 ± 7.6 years old, ratio M:F 11:11, and 5 left handed. Tolerability: Only mild side effects were observed and included scratching and tingling at the wrist for the median nerve stimulation and mild drowsiness in participants during auditory stimulation. Although still underway, preliminary analyses suggest that 10 hz median nerve and auditory click stimulation conditions generated a significantly greater

entrainment effect on endogenous alpha activity than 40-Hz median nerve stimulation and binaural 400-410 hz beat. Further analyses will integrate previous data from tACS stimulation in controls to directly compare brain alpha activity modulation from peripheral as opposed to central stimulation.

480 Seizure Risk from rTMS in Patients with Disorders of Consciousness after Traumatic Brain Injury: Foundational Evidence Needed to Support Clinical Adoption

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ABSTRACT

For persons with disorder of consciousness (DoC) after traumatic brain injury (TBI), the therapeutic potential of repetitive Transcranial Magnetic Stimulation (rTMS) was introduced in 2006. Emerging evidence, since then, indicates that some patients benefit from rTMS. Concerns remain, however, that rTMS will exacerbate an already elevated risk of seizures. To advance understanding of rTMS-related seizure risk for persons with DoC after TBI, results from a meta-analysis will be reported. To encourage collaborations, results will be reported within the context of the data needed for FDA approved clinical use in the United States.

The meta-analysis was based on a sample of people remaining in a state of DoC for 6.5 months to 15 years after TBI (n = 20) and who received either active rTMS (n = 17) or placebo rTMS (n = 3). The sample was derived from three rTMS clinical trials, two within-subject and one was a double blind randomized placebo-controlled trial. Each trial used the same 10Hz rTMS protocol to provide 30 rTMS sessions with rTMS delivered to the dorsolateral prefrontal cortex that is aligned with current safety guidelines.

During each trial's rTMS treatment phase, seizure occurrences were compared between active and placebo groups using logistic regression. After stratifying active group participants by presence/absence of seizure occurrences, sub-groups were compared using contingency chi-square tests of independence and relative risk (RR) ratios.

Two participants experienced seizures (1-active, 1-placebo). Post seizure, both participants returned to baseline neurobehavioral function. Both participants received antiepileptics throughout all remaining rTMS treatment sessions, that were completed without further seizures. Similar to baseline seizure risk, the rTMS-related seizure incidence rate is 59 per 1,000 persons. Logistic regression revealed no difference in seizure occurrence by treatment condition (active vs. placebo) or when examined with seizure risk factors ($p > 0.1$). Presence of ventriculoperitoneal shunt elevated seizure risk (RR: 2.0).

In conclusion, the findings based on this meta-analysis provide the foundation toward achieving the long-term goal of obtaining FDA approval for clinical use of rTMS in persons with DoC after TBI. Specifically, these phase I safety findings demonstrate absence of harm for a small group of participants who met medically conservative study eligibility criteria. Collectively, findings indicate a low likelihood that the specified rTMS protocol exacerbates baseline seizure rates in persons with DoC after TBI. In the presence of VP shunts, however, rTMS likely elevates baseline seizure risk and mitigation of this increased risk with pharmacological seizure prophylaxis should be considered. The findings also support broadening study eligibility criteria to address next step(s) in the FDA approval process, which involves demonstrating safety and efficacy in a larger and more diverse cohort based on a clinical trial powered to detect at least a moderate therapeutic effect.

481 EEG Response to Interruption of Sedation Benefits Prognostication Following Severe Brain

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ABSTRACT

Background: Accurate assessment of severely brain injured patients' levels of consciousness and potential to recover underpins most crucial decisions but poses a major challenge for clinicians in the intensive care unit. The neurological wake-up test (NWT) is a widely used clinical tool which comprises a behavioral assessment following a short interruption of sedation. A good behavioral response during interruption of sedation has high positive prognostic value. However, the absence of a behavioral response has few negative diagnostic or prognostic value, as it may be caused by confounding factors ranging from sensory or motor impairments to pain and fatigue. We propose the brain's electroencephalogram (EEG) response during interruption of propofol sedation as a clinical tool to identify neurophysiological signs of waking up to complement behavioral assessment during the NWT.

Methods: We recorded 128-channel EEG of 41 severely brain-injured patients during a clinically indicated NWT. Behavioral responsiveness was assessed using the Glasgow Coma Scale (GCS) before and during interruption of sedation. During the NWT, nine patients regained responsiveness, 13 patients showed ambiguous responsiveness, and 19 patients were not responsive. Brain response to sedation interruption was quantified using the dynamic change of EEG power, spatial ratios and the spectral exponent. The patients' survival, recovery of responsiveness, and functional outcomes were assessed up to 12 months post-recording. Predictions on the patients' functional outcome were provided by the attending physician. We trained a linear regression model to identify brain patterns related to a good behavioral response to the NWT. We then used the same model to identify a favorable reaction of EEG patterns in patients whose behavioral response was ambiguous or absent. Prognostic value was assessed using the Mann-Whitney-U test and the Area under the curve (AUC).
Results: Patients' increase in arousal following sedation interruption was accompanied by changes in the EEG, most notably in the delta, alpha and low beta bandwidth and the spectral exponent. Using EEG signature during interruption of sedation in addition to behavior revealed a heterogeneity in patients, with some patients showing dynamically changing EEG patterns despite absent or ambiguous behavioral responsiveness. Compared to the observed change in behavior, predicting change in arousal based on patients' EEG response increased the AUC from 0.64 to 0.74. EEG-based predicted behavioral response significantly distinguished patients according to survival ($U = 83$, $p<0.05$). Using the contrast of EEG patterns with and without sedation had higher prognostic value than using EEG features of a single state alone. Physician predictions of functional outcome were marked by a high level of uncertainty, which was maximal when patients show an ambiguous behavioral response.
Conclusions: Our results indicated that EEG features can complement behavioral responsiveness to provide clinicians a novel perspective on capacity of consciousness which goes beyond behavior.

482 Personalized Music or Binaural Beats for Identifying Consciousness in Patients with Severe Acquired Brain Injuries?

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ABSTRACT

Background: Music enhances arousal and attention when compared to white noise or disliked music or when compared to a control non-musical auditory stimulus, suggesting a potential impact of music therapy in patients with disorders of consciousness (DoC). Recently, binaural beats (perceptual phenomenon occurring when presented two tones with different frequency) also seems to influence arousal and attention. Such stimulation has nevertheless never been directly compared in DoCs.
Objective: In this multi-centric project, the short-term effects of both preferred music and binaural beats (with Beta waves, 20-30hz) on DOC patient's responsiveness were compared.
Methods: A within subject design was used in one session and 2 conditions (music and beats) presented after a baseline in pseudo-randomized order between subjects. Stimuli were presented using earbuds at the patients' bedside. Frequencies of behavioral responses were recorded at baseline and after each condition using selected items of the Coma Recovery Scale-Revised (CRS-R).
Participants: 77 patients (mean age: 51±20 years, 41 males) classified as being in a DoC (i.e., 53 minimally conscious state - MCS or 24 vegetative state - VS) based on the CRS-R were included in this study. Time since injury ranged from 6 months to 8 years. Etiologies included traumatic brain injuries (TBI; n = 27), stroke (n=17) and anoxia (n = 27).
Results: Using Wilcoxon tests, when each condition (music or beats) was compared to baseline, higher frequencies/responses were observed for arousal ($w=-1.63$; $p=.05$), visual tracking ($w=-2.05$; $p=.02$), movement to command (body-related; $w=-1.95$; $p=.02$), only for preferred music. No significant increase was observed for binaural beats. The effect for visual tracking was bigger for TBI/stroke than for anoxia ($p=0.02$). Finally, when comparing preferred music to baseline, we found a misdiagnosis of 21% (5/24) in VS and 29% (4/14) in MCS- (mostly, due to response to command), suggesting that using preferred music could help detecting signs of consciousness when diagnosing DoC.
Conclusion: According to our results, preferred music seems to promote arousal but also (and potentially, in turn) improves the detection of important signs of consciousness (such as willful body-related movements and visual tracking). Future studies should investigate the biomechanisms related to such improvements in patients with DoCs. Binaural beats (Beta waves) does not seem to lead to similar effects. However, using other frequencies (Theta or Alpha waves) might lead to different results and should be studied too.

483 Differential Effects of Transcranial Direct Current Stimulation on Frontal Lobe Function in Individuals With and Without Mild Traumatic Brain Injury

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ABSTRACT

Mild traumatic brain injury (mTBI) results in a cascade of symptoms, from motor coordination problems to light

sensitivity, and headache. For most people, the majority of the symptoms resolve themselves over a few days or weeks. However, it has been well established that many symptoms may last for many months and longer depending on the severity and number of previous injuries sustained. These longer lasting symptoms include memory problems and executive dysfunction and often are associated with lasting frontal lobe processing issues. The current study aimed to evaluate the lasting impact of mTBI on frontal lobe function and examine the effectiveness of transcranial direct current stimulation (tDCS), at remediating those symptoms. A sample of young adults with and without a history of mTBI were recruited and evaluated using cognitive/behavioral tests that implicate an increasing demand on the frontal lobe. Cognitive tests included common frontal engaging tasks such as the Iowa Gambling task, a Go No-Go task, and multiple response inhibition tasks. Prior to testing, half of the participants, both with and without mild traumatic brain injury were given a single 20 minute tDCS treatment session prior to their frontal lobe assessment and the other half were given a sham tDCS procedure to eliminate expectation effects. Comparisons in task performance, both response time, accuracy, and overall performance were conducted. Results demonstrate that individuals with a history of mTBI show alterations in performance on frontal lobe demanding tasks. These changes are demonstrated for as long as 3 years after injury. Also, tDCS may alter those dynamics differentially depending on the participant's brain injury status. The results suggest that the frontal lobe functioning of individuals with a history of mTBI is altered even after other symptoms resolve. Additionally, although tDCS may provide some hope as a treatment to alleviate these symptoms, individuals suffering from mTBI may require more tDCS sessions than controls to show improvements.

484 From Cognitive Tests to Traffic: Enhancing Post-Stroke Driving Assessments for Better Outcomes

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ABSTRACT

Objective: Post-stroke driving assessments must incorporate precise and ecologically valid evaluations to ensure road safety and support survivors' independence. In Norway, many stroke patients are predominantly assessed for driving fitness using only the Mini-Mental State Examination (MMSE), the Clock Drawing Test (CDT), and the Trail Making Tests A and B (TMT-A and TMT-B). This study aimed to investigate the relationship between performance on these screening tests and: 1) the results of an on-road driving test rated with the P-DRIVE scoring protocol, and 2) the multidisciplinary outcome of pass or fail in the driving assessment.

Methods: Forty-four stroke patients (thirty-six men, mean age 58.3 ± 12.4 years) participated in this study. Each participant completed the MMSE, TMT-A, TMT-B, and the CDT. Logistic regression analysis was performed to determine the relationship between TMT-A, TMT-B, CDT, and MMSE as independent variables and the binary outcome of the multidisciplinary driving assessment (Pass or Fail). Additionally, linear regression was utilized to predict driving performance as rated by P-DRIVE, based on the same independent variables.

Results: The logistic regression analysis indicated that the combination of neuropsychological tests significantly predicted the multidisciplinary driving assessment outcome, with TMT-A showing a negative association (Odds Ratio [OR] = 0.970) and MMSE exhibiting a positive but non-significant effect (OR = 1.230). In the linear regression model predicting P-DRIVE, an intercept of 113.82 was observed, with TMT-A significantly contributing to driving performance (β = -0.299, p = 0.014). However, TMT-B, CDT, and MMSE did not show statistically significant contributions. The model explained approximately 28.47% of the variance in P-DRIVE (Adjusted R^2 = 0.2005) and was statistically significant (p = 0.01963).

Conclusion: These findings underscore the critical importance of targeted neuropsychological assessments in evaluating post-stroke driving fitness. While TMT-A emerged as a significant predictor of driving performance, MMSE did not contribute meaningfully to the predictive models. This highlights the need to expand the cognitive assessment repertoire beyond the MMSE, CDT, and TMT tests to enhance the accuracy of driving fitness evaluations. Ultimately, such comprehensive assessments are essential for ensuring road safety and facilitating stroke survivors' return to independent driving.

485 Vibroacoustic Stimulation as an Intervention for Persisting Concussion Symptoms in Youth with Autonomic Dysfunction

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ABSTRACT

Background: Vibroacoustic stimulation therapy can support autonomic function through enhanced sympathetic/parasympathetic balance. Autonomic dysfunction is a key pathophysiological pathway underlying persisting post-concussion symptoms (PPCS). Therefore, any treatment that can effectively address autonomic dysfunction should help remediate PPCS.

Objectives: Our study examined the efficacy of a wearable vibroacoustic stimulation device (VSD) for remediating PPCS pathology and improving functional outcomes.

Methods: Patients at a pediatric concussion clinic presenting with PPCS were offered the VSD as an adjunct to standard care for six weeks. Control participants (n = 25) received standard care alone and were matched to the VSD group (n = 25) on demographic and concussion injury variables. Participants completed an assessment battery pre- and post-intervention, consisting of the Rivermead Post-Concussion Symptoms

Questionnaire (RPQ), Beck Depression Inventory (BDI), Behavioral Rating Inventory of Executive Function (BRIEF), Neurological Quality of Life (Neuro-QoL) sleep and fatigue scales, Vestibular Ocular Motor Screening (VOMS), Cogstate testing battery, and heart rate variability (HRV). The Cogstate battery included the Groton maze task and one- and two-back working memory tasks. HRV was recorded during rest, deep breathing, and isometric handgrip contraction. HRV reactivity (ΔHRV) was calculated by subtracting the deep breathing condition from handgrip contraction. In accordance with prior literature, participants with positive pre-intervention ΔHRV values were classified as having autonomic dysfunction (DYS+). Statistical analyses consisted of 2 (time: pre/post-intervention) by 4 (group: VSD-DYS+, VSD-DYS-, Control-DYS+, Control-DYS-) mixed ANOVAs with post hoc Bonferroni-corrected t-tests for significant results.
Results: Eleven VSD participants and 13 Controls displayed pre-intervention autonomic dysfunction. There was a significant group x time interaction for ΔHRV, whereby the VSD-DYS+ group exhibited a decrease in ΔRMSSD pre- to post-intervention ($d = 1.00$, $p = 0.032$), while the other groups did not (VSD-DYS-: $d = 0.40$, Control-DYS+: $d = 0.12$, Control-DYS-: $d = 0.27$, p's ≥ 0.624). There was also a significant interaction for the one-back, with the VSD-DYS - group exhibiting increased accuracy pre- to post-intervention ($d = 0.96$, $p = 0.012$), while the other groups did not (VSD-DYS +: $d = 0.74$, Control-DYS+: $d = 0.06$, Control-DYS-: $d = 0.28$, p's ≥ 0.132). There were no significant group differences in resting HRV, maze learning/recall, nor symptoms assessed by the RPQ, BDI, BRIEF, Neuro-QoL, or VOMS (p's > 0.05). Average daily minutes of VSD use was correlated with change in resting HRV metrics (r's ≥ 0.42, p's ≤ 0.036), but not with the remaining functional or symptom measures.
Conclusions: Our results provide preliminary evidence that vibroacoustic stimulation therapy may support the recovery of PPCS via enhanced cardio-autonomic function and improved working memory. Furthermore, those who benefit the most appear to be those with significant autonomic dysfunction.

488 Neurorehabilitation Quality During COVID-19: Lessons Learned and Recommendations for Future Crises

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ABSTRACT

Context: During the state-of-emergency of the COVID-19 pandemic, standards of neurorehabilitation care in intensive rehabilitation facilities (IRFs) were significantly altered. These changes affected the physical environment and care trajectories for patients, families, and healthcare professionals. Designated facilities established isolated "hot zones" for COVID-19 patients while maintaining "cold zones" for routine care. In 2021, a Québec-wide research team initiated a retrospective analysis to document the trajectory and outcomes of rehabilitation care during the initial pandemic waves.
Methods: The study used a mixed methods approach, combining quantitative and qualitative data from designated rehabilitation facilities. The quantitative analysis involved reviewing 993 medical records of patients, focusing on indicators such as Functional Independence Measure (FIM) scores and its Minimal Clinically Important Difference (MCID) scores, length of stay, intervention doses, rehospitalization rates. Qualitative data were collected through consultations with 55 stakeholders. The Post-Acute Care rehabilitation framework integrated findings into key targets for future crisis preparedness.
Results: Regarding clinical outcomes, patients in both "hot" and "cold" zones showed similar functional progress (FIM and MCID $p>0.05$). However, those infected with COVID-19 experienced longer stays ($p<0.001$) and received lower intervention doses ($p<0.001$). Despite lower functional capacity at admission and discharge ($p<0.01$), the proportion of patients reaching FIM MCID was similar between groups ($p=0.37$). Nosocomial COVID-19 infections were associated with lower slower progress ($p<0.05$), and increased rehospitalizations ($p<0.05$). Regarding the trajectory, qualitative findings revealed that best practices were more disrupted in "hot zones" compared to "cold" ones. Issues related to rehabilitation structures, staffing, facilities, and communication impacted care quality. The prohibition of family visits and physical isolation significantly affected patients' psychological well-being and discharge planning.
Conclusions: The rehabilitation care system demonstrated resilience in adapting to pandemic challenges. Although the quality of care remained sufficient to support functional progress, efficiency was notably compromised for patients with nosocomial infections in designated IRFs. Lived experiences were characterized by social isolation and disruptions in the continuum of care. This comprehensive assessment of care quality and stakeholders' experiences identifies five key areas for improving future health crisis preparedness in neurorehabilitation: valuing families, creating a supportive rehab environment, fostering socialization, ensuring a safe care trajectory, and favoring local management. These findings offer valuable guidance for policymakers and healthcare professionals.

489 Differences in School Services and Accommodations Between States with Varying Levels of Structured Support for Students with Traumatic Brain Injury

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ABSTRACT

Objectives: The current analysis compares the school services, accommodations, and supports of children with traumatic brain injury (TBI) who receive structured return-to-learn (RTL) support through BrainSTEPS compared to students who receive variable RTL supports (control arm).

Methods: This study is a secondary analysis of data from a longitudinal project that examines RTL support for students with TBI. Demographic and injury-related information was collected via caregiver report on REDCap. Specific RTL support was measured through The Child and Adolescent Scale of Participation (CASP) and caregiver-reported academic records. Descriptive statistics and an analysis of covariance (ANCOVA) investigated differences in the type of RTL services provided for students with TBI based on their study arm (BrainSTEPS or control) or injury severity (mild or moderate/severe), while controlling for time.

Results: This analysis included a total of 398 observations across 84 participants with an average of 4.74 observations per participant. The average age of students was 13.05 years old (SD = 3.44) for those who received BrainSTEPS support and 11.27 years old (SD = 3.64) for those who received variable supports (control group). In the ANCOVA results, the main effect for BrainSTEPS versus control group was significant, $F(1, 392) = 13.35$, $p < .001$, $\eta p^2 = 0.03$, indicating the students who were receiving the support of BrainSTEPS were significantly more likely to report receiving formal school services. The main effect for injury severity was also significant, $F(1, 392) = 20.41$, $p < .001$, $\eta p^2 = 0.05$, indicating students with more moderate/severe injuries were significantly more likely to receive supports than students with mild injuries.

Conclusions: This project is unique in its comparison of the structure of support and the types of services a student could receive in their recovery journey. The use of ANCOVA helps portray the significant differences between a structured and variable RTL program and the experiences of students recovering from a TBI. Receiving appropriate and effective services is a crucial part of the RTL process and is a gap in the current academic model.

490 Social, Health, and Academic Performance of Children with TBI Engaged in a Formal Return-to-School Support Program: An Evaluation

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ABSTRACT

Significance: Children have the highest rate of emergency department visits for traumatic brain injury (TBI) of all age groups. An injury of any severity to the developing brain can disrupt a child's developmental trajectory and may result in restrictions in school classwork requirements and participation in activities such as sports and extracurricular clubs and projects. As a result of a TBI of any severity, children may experience changes in their health, thinking, and behavior that affect learning, self-regulation, and social participation which are important in becoming a productive adult.

Objectives: The objective of the Return to School project, funded by the Centers for Disease Control and Prevention, is to evaluate the efficacy of a Return to School (RTS) model in Oregon. The primary aim of the research is to compare the effectiveness of the Oregon RTS model to treatment as usual in Ohio in improving health, educational, and social outcomes for students in grades K-12 who have experiences TBI of any severity compared to students who have no formal RTS programming. A second aim was to measure the implementation and fidelity of the COR-TBI program with a third aim to understand the implementation levers if the program is deemed effective.

Methods: COR-TBI uses a quasi-experimental comparison group design using propensity matched scoring. The IRB-approved protocol includes electronic survey administration of parent, student, and teacher measures on the social, behavioral, and health outcomes of students experiencing a TBI. This presentation focuses on the specific academic, social, and health functioning for 721 (425 treatment and 296 business as usual) school-age children and adolescents at the time of study enrollment. Recruitment was between Fall 2020 through Spring of 2024 with data collection ending summer of 2024. A qualitative component utilizing virtual interviews and focus groups collected in 2023 with key stakeholders of parents, students, teachers, school, and community health care providers. Thematic analyses were completed. Based on formative findings from the focus group and interview data, a nationwide survey of school principals/asst. principals is being conducted in spring 2024 to further understand the knowledge, attitudes, and practices of school principals relative to serving students experiencing TBI in K-12.

Results: At the time of the presentation, we will have conducted the outcome analyses on the quantitative aim to measure the efficacy of the COR-TBI program. School principal survey data will also be analyzed and ready to share at the time of the presentation. Medical provider interviews defined multiple themes to better understand how schools, families, and the medical community can collaborate to ensure students are provided the needed school accommodations following a TBI event. Lessons learned from the study along with implications for schools and medical providers will be shared.

491 Improving Mobility and Balance after Traumatic Brain Injury (TBI): A Randomized Controlled Trial Evaluating High-Intensity Step Training (TBI-HIST) Protocol.

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ABSTRACT

Impaired mobility and balance are two common long-term sequelae of TBI that have substantial negative life impacts and

often persist for years post injury. Individuals with TBI walk more slowly, demonstrate greater imbalance, and have reduced endurance when compared to nondisabled counterparts; evidence suggests that improving mobility and balance after TBI is associated with improved quality of life and community participation. Further, there is strong evidence that a single bout of physical activity has substantial cognitive benefits among other diagnostic groups such as older adults and stroke survivors, yet similar studies have not been conducted in TBI. Interventions targeting increased walking speed have not been well studied in TBI, despite the fact that walking speed is designated as the Sixth Vital Sign and the Functional Vital Sign. Walking speed is related to functional capacity, general health status, and predicts functional independence and mobility disability in older adults. To address this gap, a randomized controlled trial has been implemented at a TBI Model Systems center in which individuals admitted to inpatient rehabilitation are randomized to one of the following groups to receive an extra hour of training per day (goal to reach 30 sessions) in addition to their primary therapy program: the first approach, conventional gait and balance training, primarily focuses on over ground walking and balance training. The second approach is known as high intensity step training (HIST), which focuses on the repetition of stepping at higher cardiovascular intensities (70-85% of age predicted maximum heart rate). The third therapeutic intervention combines HIST with virtual reality (HISTVR), designed to increase cortical excitability while concurrently activating the neuromuscular system. In this proposal, we will review the study protocol as well as early participant enrollment characteristics, barriers, and challenges associated with implementing a high-intensity mobility study during inpatient rehabilitation. To date, sixty individuals with TBI have been enrolled between March of 2023 and September of 2024 with 12 individuals being withdrawn from the study primarily due to unexpected changes in discharge dates, discharge disposition, and fatigue. No serious adverse events have been reported and enrolled participants have completed a mean of 23 sessions of training. Median age across participants is 34 years old (interquartile range 25, 53) and females make up 17% (n=8) of those enrolled. 87% of individuals identified their race as White; Hispanic, Latino, or Spanish ethnicity was reported by 13% of individuals. Target heart rate zone has been achieved during training with 93% of individuals completing the protocol. In summary, implementing a high-intensity mobility training protocol during inpatient rehabilitation is safe and feasible. A discussion regarding the protocol and common barriers and facilitators experienced to date may benefit future research and programmatic implementation efforts.

492 Concussion and Neurodevelopmental Disorders: Exploring Health Outcomes and Service Utilization

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ABSTRACT

Background: Approximately 10% of all children and youth (≤ 18 years) have a neurodevelopmental disorder (NDD) such as autism spectrum disorder, attention-deficit/hyperactivity disorder, or learning disabilities. Individuals with a NDD are more likely than their neurotypical peers to experience a concussion and are at a greater risk of persisting symptoms after a concussion. Across youth that experience a concussion, the proportion with a co-occurring NDD can be as high as 34%. Despite calls for more inclusive concussion guidelines, there is a dearth of studies focused on youth with a NDD who experience a concussion, limited knowledge about their experiences or outcomes, and no clinical guidelines for concussion management that considers the unique needs of these individuals.

Objectives: To describe the clinical presentation and services accessed by children and youth with a NDD who experience persisting symptoms after a concussion.

Methods: This study will include a retrospective chart review of health outcomes and service utilization (i.e., continuity, comprehensiveness, accessibility, and productivity) for children and youth with a NDD seen in the Persistent Concussion Clinic (PCC) at Holland Bloorview Kids Rehabilitation Hospital in Toronto, Ontario from July 2015 to August 2023. The PCC is the only publicly funded interdisciplinary clinic in Ontario for children and youth experiencing persisting symptoms after a concussion. Information related to demographics (e.g., age, sex, medical history), setting of concussive injury, and service utilization (e.g., disciplines accessed, number of appointments) will be extracted for clients with and without a NDD. Descriptive statistics will be used to describe demographics and service utilization. Additionally, t-tests and ANOVA ($p< 0.05$) will be used to compare service utilization between clients with and without a NDD.

Results: Over 700 charts will be included in the retrospective chart review with approximately 20% of these children and youth reporting a NDD upon entrance to the PCC. This is likely a conservative estimate as clients may have an undiagnosed NDD or receive developmental diagnoses or referrals while working with the clinical team. Additional analyses are ongoing.

Conclusions: Children and youth with a NDD who experience a concussion are an underrepresented and often overlooked group, with no clinical guidelines describing how to best support them. As the PCC is a unique clinic, anticipated results will shed light on health outcomes and service utilization for children and youth with a NDD who experience persisting symptoms after a concussion. Better understanding the needs of this population will provide initial contributions to clinical recommendations, ultimately addressing gaps in care.

493 Executive Function and Emotion Regulation in Collegiate Athletes with History of Mild Traumatic Brain Injury (mTBI)

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ABSTRACT

Background: Participation in sports increases the risk of sustaining a mild traumatic brain injury (mTBI) also known as sports-related concussion (SRC) (Dioso et al., 2022). One-third of collegiate athletes report experiencing a concussion in their lifetime, with 20% having more than three (Veliz et al., 2019). SRCs are associated with transient-to-long-term cognitive and emotional difficulties. We examined executive functioning and emotion regulation for athletes with self-reported mTBI/SRC relative to athletes without TBI history. Emotion regulation has been understudied, though collegiate athletes with affective symptoms tend to have delayed recovery and return-to-play following SRC.

Methods: A cross-sectional, between-groups design with collegiate athletes recruited from universities in Western New York. Neuropsychological tests of general cognitive and executive function (Test of Premorbid Function, WAIS-IV: Digit Span, Matrix Reasoning, Vocabulary, Letter-Number Sequencing; Delis-Kaplan Executive Function System (DKEFS): Trail Making Test, Verbal Fluency, Color Word Interference), subjective measures of executive function (Behavior Rating Inventory of Executive Function-Adult, BRIEF-A) and emotion regulation (Difficulties in Emotion Regulation Scale, DERS; Symptom Assessment-45 Questionnaire, SA-45; Buss-Perry Aggression Questionnaire, BPAQ) were completed.

Results: Collegiate athletes (Mage = 19 yrs, SD = 1.29) with self-reported history of concussion/mTBI (n = 26) and without concussion/mTBI (n = 27) played a variety of sports including soccer, wrestling, lacrosse, football, and basketball. The majority of reported TBIs were mild (80%) or subconcussive (20%) (e.g., Silverberg et al., 2023). More than half (58%, n = 15) of the athletes reported sustaining multiple concussions. Athletes with self-reported mTBI were significantly less accurate and efficient on measures of executive function relative to their peers without mTBI, especially with increasing task demands and complexity (e.g., DKEFS TMT LN-Sequencing, mTBI: M = 66.12 secs, SD = 27.31; no mTBI M = 51.85, SD = 15.35, $p < .05$). Athletes with mTBI demonstrated difficulties with self-monitoring in that they made significantly more repetition and set-loss errors, and had poorer accuracy than those without mTBI (D-KEFS Letter Word Fluency, $p < .01$; D-KEFS Category Switching Fluency, $p < .01, .05$). Self-reported executive function (i.e., BRIEF-A) did not differ significantly between groups. Emotion dysregulation was endorsed less than hypothesized (DERS; SA-45), however, significantly more physical aggression (BPAQ) was acknowledged by athletes with mTBI (M = 18.27, SD = 6.82) relative to no-mTBI (M = 15.48, SD = 4.49, $p < .05$).

Conclusions: Consistent with the literature, this study highlights post-mTBI/concussion sequelae for high-level athletes particularly difficulties with executive functioning and aspects of emotion regulation relative to their peers. Complex bidirectional prefrontal and subcortical circuitry subserve executive function and emotion regulation (Martin & Ochsner, 2016). Pre – and – postinjury factors including cognitive reserve, recovery trajectory and treatment should be explored. Postinjury sequelae, symptom monitoring, and therapeutic intervention is warranted for collegiate athletes.

494 Implementation of the Coma Recovery Scale-Revised for Accelerated Standardized Assessment (CRSR-FAST) in the Inpatient and Outpatient Rehabilitation Setting: Rationale, Benefits, and Challenges

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ABSTRACT

The Coma Recovery Scale Revised (CRS-R) has been used consistently in the Craig Hospital rehabilitation center inpatient setting for over a decade. The CRS-R assessment team at Craig is a multidisciplinary team including Physical Therapists, Occupational Therapists, Speech Therapists, Recreation Therapists, Neuropsychologists, a Physician, and Clinical Research Therapists. Members of this team pair up with primary therapists to administer the CRS- R to appropriate patients in the hospital. Recently the CRS-R FAST was published by the Spaulding-Harvard Traumatic Brain Injury Model System. THE CRS-R FAST is an abbreviated version of the CRS- R validated for use in the intensive care unit as a quick and objective behavioral evaluation of level of consciousness. Our team has started to consider the best ways to integrate the CRS R FAST into our system of care and our typical testing procedures. The CRS R FAST does not provide the same amount of robust and specific information as the full CRS-R, but does provide a unique opportunity for caregivers and other staff members to objectively look for signs of consciousness and track changes in this population. So far this assessment has been used at Craig to help educate caregivers and staff members on what behavioral signs of consciousness are, provide caregivers and family members a way to look for changes in their loved one's presentation over time, and will likely be used by primary therapists when appropriate to decrease the amount of CRS-R testing from the trained CRS-R team until a medication change or observed behavioral changes warrants more consistent CRS R testing. There are additional challenges to implementation, and because the exam has not been validated in the rehabilitation setting we are just beginning to implement the assessment into our care and are attempting to use this assessment appropriately. Our purpose is to discuss what may and may not be the best uses of the CRS-R FAST as a tool in the rehabilitation setting to help support our interventions and education provided to those caring for the Disorders of Consciousness population.

495 Outcome of Cognitive Behavioral Disorders on Patients with Severe Acquired Brain Injury: A Preliminary Study

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ABSTRACT

Introduction: Severe acquired brain injury (ABI) result in multiple and complex impairments, with disabling outcomes that represent a significant healthcare and social concern. These patients experience cognitive and behavioral disorders, impacting family, social, and work. Additionally, psychiatric issues are often reported in these patients.

The aim of this study is to investigate the evolution of outcomes in patients with severe ABI during rehabilitation, focusing on cognitive-behavioral outcomes and potential psychiatric issues, global outcome, and discharge destination. This investigation is preliminary to a study that will examine outcomes 2-3 years post-discharge, focusing on quality of life, the impact of cognitive-behavioral outcomes on caregivers, and the patient's participation in daily activities.

Methods: We retrospectively analyzed a database of patients with severe ABI of different etiologies (vascular, traumatic, anoxic, neoplastic, infectious) who were admitted to the Severe Brain Injury Unit at the University Hospital of Ferrara between January 1, 2021, and December 31, 2022, for comprehensive rehabilitation. All patients with an initial Level of Cognitive Functioning (LCF) score between 2 and 7 were analyzed. Patients who did not show emergence from a disorder of consciousness based on the Coma Recovery Scale-Revised were subsequently excluded. The patients with a discharge LCF score between 4 and 7 were enrolled. LCF and global outcome scores (using the Glasgow Outcome Scale Extended, GOSE) were assessed at admission and discharge, as well as the discharge destination. We analyzed how many patients underwent psychiatric evaluation and which were the main reasons for such consultations.

Results : A total of 142 patients with severe ABI of various etiologies (vascular 69, traumatic 54, anoxic 7, neoplastic 4, infectious 8) were enrolled. The average age was 52 years. The mean LCF score at admission was 4.8, and at discharge, it was 6.7. The mean GOSE score at admission was 3.4, and at discharge, it was 5. Out of the total, 116 patients were discharged home with an average LCF score of 6.3 and a GOSE score of 5.28. 4 patients continued intensive rehabilitation closer to their residence, while 22 were admitted to long-term care facilities. Psychiatric consultations were requested for 37 patients, (psychomotor agitation, aggression, mood depression, sleep-wake disturbances, emotional discontrol, and psychiatric treatment adjustments). 17 of these patients had a previous psychiatric history, particularly substance abuse, anxiety-depressive syndrome, and bipolar disorder.

Conclusions : The study observed an overall improvement in cognitive-behavioral function and GOSE at discharge from rehabilitation. Patients admitted to residential facilities had more severe cognitive impairment compared to those discharged home. 26% of patients showed psychiatric issues requiring specialized evaluation. Further research is needed to examine long-term cognitive outcomes, the possible presence of psychiatric disorders, and their functional impact on quality of life, patient participation, and the burden on caregivers.

496 Comparison of Concussion Recovery and Outcome Severity Among Pediatric Patients with First Time SRRC or MVA Injuries

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ABSTRACT

Background: Pediatric concussions have garnered attention due to their prevalence and potential long-term effects. Most research focuses on sport- and recreational-related concussions (SRRC), while other etiologies such as motor vehicle accidents (MVA) get overlooked. However, given the more physically and emotionally traumatic nature of MVA, these injuries may result in more severe outcomes and drawn -out recovery. Accordingly, this study aimed to evaluate the relative risk of developing PPCS between SRRC and MVA, as well as compare psycho-affective health, cognition, and quality of life following injury.

Methods: We retrospectively analyzed prospective data from pediatric patients (age m = 14.7 years) evaluated at a concussion clinic from 2017-2023. All participants (N = 67) were categorized based on injury mechanism (SRRC, n = 47; MVA n = 20), and no participant had a prior history of concussion. All participants came to the clinic two times, separated by approximately 1 month (eval 1, m = 16.7 days post-injury; eval 2, m = 46.3 days post-injury). Outcome measures included the Rivermead Post-Concussion Questionnaire (RPQ), Beck Depression and Anxiety Inventory (BDI, BAI), Behavior Rating Inventory of Executive Function (BRIEF), and Neurological Quality of Life (Neuro-QoL) assessments. Chi-square tests were used to evaluate relative risk, and repeated measures ANOVAs (2 group x 2 time) and t-tests (using Bonferroni correction) were used to evaluate main effects and significant interactions, respectively.

Results: MVA patients were more likely to experience loss of consciousness (OR = 7.2, $p \leq 0.01$) and incur post-injury amnesia (OR = 3.3, p's ≤ 05). Relative risk for developing PPCS was greater in the MVA than SRRC group (RR = 3.8, $p = 0.01$). Across both timepoints the MVA group reported greater symptom burden on the RPQ (13 & 16), reported greater emotional (RPQemotion) and cognitive (RPQcognition) disruptions, and greater sleep disturbance (p's < 0.05). Furthermore, a group x time interaction was observed with MVA exhibiting greater levels of fatigue than SRRC at timepoint 2 ($p < 0.01$). No significant group

differences were observed for depression, anxiety, or parent/guardian reports of executive function (p's ≥ 0.2).
Conclusions: Adolescents with MVA-related concussions are more likely to develop PPCS and exhibit stronger and longer-lasting sleep disturbance and fatigue. Interestingly there were no group differences in terms of anxiety, depression, or cognition, highlighting the necessity of multi-domain assessments. These findings underscore the need for tailored clinical management strategies as pediatric patients with MVA and SRRC may experience distinct symptom sequalae.

497 Swallowing Disorders in Patients with Disorders of Consciousness After Severe Brain Injury: Clinical Evolution and Relationship

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ABSTRACT

After a severe acquired brain injury (ABI), patients may present disorders of consciousness (DOC), from unresponsive wakefulness syndrome/vegetative state (UWS/VS) to minimally conscious state (MCS). These patients show severe oropharyngeal dysphagia. The assessment and clinical treatment of swallowing dysfunctions are crucial due to functional consequences and related comorbidities.
Recent studies suggested that an effective oral phase could be determinant in contribuiting to identify swallowing as a conscious behaviour.
This study aims to examine knowledge on oropharyngeal dysphagia in subjects with DOC.
Objective:
- Investigate correlations between swallowing severity and DOC.
- Analyze swallowing features and their potential role as a diagnostic and prognostic criterion for consciousness disorders. This includes tracing the evolution of both behavioral and swallowing disorders through longitudinal evaluations and identifying prognostic factors that could suggest different recovery profiles for DOC.
Methods: This is a prospective observational study involving people with DOC. All patients accessing the Acquired Brain Injury Unit at the University Hospital of Ferrara and meeting the inclusion criteria will be enrolled. Inclusion criteria: males and females over 18 years, diagnosed with prolonged consciousness disorder (more than 28 days after brain injury) classified as MCS or UWS/VS according to Giacino, resulting from severe brain injury of different aetiology (traumatic, vascular, anoxic, neoplastic and infective) within 3 months from the event.
Clinical and demographic information will be collected at admission (age, sex, time since the event, etiology, presence and characteristics of tracheostomy, prescribed drugs). All patients will assessed through the Coma Recovery Scale-Revised (CRS-R) and the Swallowing Assessment in Disorders of Consciousness (SWADOC). These assessments will take place at rehabilitation admission (T0), after 2 weeks (T1), 4 weeks (T2), 8 weeks (T3), 12 weeks (T4), and 6 months (T5). Instrumental evaluation will include: EEG recording (20-minute resting-state) at T0, T2, and T4; when feasible (presence of therapeutic feeding), patients will be assessed also with Fiberoptic Endoscopic Evaluation of Swallowing. Rehabilitation treatment of dysphagia will be daily recorded in a clinical diary, compiled by a therapist, including information on dosage, frequency, and type of stimulations.
Data will be analyzed in subgroups based on etiology, depending on sample size achieved.
Expected Results: The type of oropharyngeal dysphagia found in DOC, the evolution of consciousness disorder, swallowing behavior, and potential clinical and temporal correlations.
Limitations: The expected limited sample size may alter the generalizability of the study results. Moreover, the wide inclusion time-frame (within 3 months) could induce to clinical differences in recovery timing; indeed, these data will be managed in data analysis.
Conclusion: Swallowing assessment and treatment are crucial elements in rehabilitation of patients with DOC after severe ABI. This study aims to deepen knowledges about oropharyngeal dysphagia in DOC, analyzing its role on functional recovery in this population.

499 The Impact of Nutritional Interventions on Rehabilitative Outcomes in Acquired Brain Injury Patients

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ABSTRACT

Background and Aims: Acquired Brain Injury (ABI) often results in various physical and neurological challenges that require comprehensive rehabilitative care. Proper nutrition plays a crucial role in recovery, with timely nutrition shown to reduce complications, enhance immune function, and improve overall neurological outcomes. Emerging research emphasizes the relationship between the gut microbiome and brain function through the gut-brain axis, highlighting the importance of dietary fibers and probiotics in reducing inflammation and improving brain health. Furthermore, the whole diet approach, which advocates for balanced and diverse food intake rather than focusing on single nutrients, has been shown to support better cognitive function and overall recovery. This study aims to explore how nutritional interventions can improve cognitive function, mood, and overall rehabilitation outcomes in individuals with ABI.
Methods: This study is currently utilizing a comprehensive assessment protocol to investigate the impact of nutritional interventions on rehabilitative outcomes in 26 ABI patients. Nutritional intake is being evaluated through detailed food logs linking cognitive function, mental health, sleep patterns, weight, behavioural observations, and blood markers including: CBC, electrolytes, blood glucose, liver and kidney function

tests, lipid profiles, thyroid hormones, inflammatory markers, Vitamin D, Vitamin B12, iron, and folate, which were assessed at baseline (July 2024) and will be assessed again six months later (January 2025) to identify biochemical changes related to dietary modifications.
Results: Based on current literature, our preliminary hypothesis expects that nutritional interventions in ABI patients will result in significant improvements across various rehabilitative outcomes. A balanced diet that includes a variety of nutrient-rich foods is likely to support better cognitive function, enhance mood, and improve sleep quality. Additionally, we anticipate that dietary interventions aimed at reducing oxidative stress and inflammation will accelerate overall recovery. We also expect that optimizing nutrient intake, including key vitamins, minerals, and essential fatty acids, will contribute to better physical and mental health outcomes. Improvements in gut health, facilitated by dietary fibers and probiotics, are also anticipated to positively influence brain function and emotional well-being.
Conclusions: We believe this study underscores the importance of a whole-diet approach to enhance rehabilitative outcomes in ABI patients. Nutritional interventions, particularly focusing on a balanced intake of essential nutrients, will significantly improve outcomes. Addressing dietary quality in ABI rehabilitation may not only enhance recovery but also provide protective benefits against further decline. Findings from this research, whether they confirm or challenge current expectations, will provide valuable direction for future work in developing more effective nutritional strategies. Continued research is warranted to explore the long-term effects of nutrition on ABI recovery and to develop tailored dietary guidelines for various patient subgroups.

500 Facilitators and Barriers Experienced by Participants with Acquired Brain Injury When Engaging in Adaptive Group Exercise Programs

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ABSTRACT

Background: Individuals with acquired brain injury (ABI) often experience loss of vocation, recreation, and social support due to chronic physical, cognitive, and social-emotional impairments. These impairments frequently persist, creating a need for community-based exercise and social connection programs.
Objective: This study introduced a community-based adaptive exercise program and evaluated the perceived barriers and facilitators to engagement, as experienced by individuals with ABI.
Methods: We conducted a descriptive qualitative study with 18 participants. A semi-structured interview guide was utilized during focus groups and interviews with participants who completed an 8-week pilot randomized controlled trial comparing two adaptive exercise programs. Interviews were audio-recorded, transcribed, and de-identified. We deductively coded the transcripts to the 14 domains in the Theoretical Domains Framework (TDF; e.g., knowledge, skill, environment).
Results: The primary theme generated from the data was: Survivors of ABI value an accessible and supportive environment in community-based, adaptive exercise programs. Eleven TDF domains were identified as facilitators and four as barriers, with three domains repeatedly emphasized by participants. The 'skill' and 'emotion' domains were described as primary facilitators. Interestingly, the 'environment' domain was identified as both a facilitator and a barrier. The 'skill' of the adaptive exercise program instructors made participants feel safe because they could modify the exercises as the program progressed. A participant stated, "it was nice to be able to feel like you were participating and completing that task that was asked for but at the level you're safe and comfortable". Safety related to 'emotion' was fostered by being a part of a group where every participant had an ABI. One participant stated, "I'm so self-conscious, you know, to just be in my body, listen to the instructions, and just do. Not look around at what everyone else is doing. Are they looking at me? You know... from the beginning, I was able to do that...I felt it from the participants, the energy from participants really makes a difference. Everyone in there is brain injured. And we're all in there to get some help with that". Regarding 'environment', facilitators included the setting, timing and structure of the program. As a barrier, participants reported receiving unclear directions for navigating pre-intervention data collection sessions, especially related to parking and building access, increased stress and reduced their desire to attend the adaptive exercise programs. Participants recommended study personnel provide multimodal, detailed communication regarding access and expectations during the study to assist their ability to navigate a new environment.
Conclusion: Our findings suggest that survivors of ABI are more likely to engage in a community-based adaptive exercise program when there is frequent communication with clear directions to support access, modifications are normalized with physical support available, and the experience is shared with other individuals with ABI.

501 Bridging A Gap in Concussion Resources: Introducing The First Disability-Centered Concussion Resource For Patients

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ABSTRACT

The vast majority of concussion research is sampled from a small subset of society: emergency department and specialty care visitors, adolescents, college athletes, and military service

members––most of whom are not disabled. The populations sampled in the literature base are broadening, but many communities are still underserved. This gap in research contributes to the lack of literature, resources, and support for individuals with a pre-existing disability navigating concussion recovery. To address this gap, Concussion Alliance has created a first-of-its-kind, online patient-facing resource for this population.

The Concussion in Para Sport (CIPS) Group produced its first position statement in 2021 to begin addressing this gap in resources for clinicians serving para-athletes and the "paucity of concussion research related to para-sport" (Weiler R. et al., 2021). However, athletes with disabilities represent a small portion of a larger population of disabled patients in need of more research, resources, and support. According to the CDC Disability and Health Data System, 28.7% of adults in the United States live with some type of disability (Centers for Disease Control and Prevention, July 2024); 12.2% of adults have a mobility-related disability, 6.2% have a hearing-related disability, and 5.5% have a vision-related disability. The World Health Organization reports that 16% of the world's population lives with "significant disability."

Evidence shows that injury presentation, assessment, and treatment practices are more complex for para-athletes and are often not easily translatable between athletes and para-athletes (Weiler R. et al., 2021). Further, a significant minority of concussion patients experience symptoms that persist beyond the four-week recovery timeline outlined by the 6th Consensus Statement on Concussion in Sport (Patricios JS et al., 2022). Given that timely and appropriate assessment, treatment, and referral for rehabilitative care are critical in mitigating persisting symptoms, concussion patients with pre-existing disabilities may be at greater risk for poor outcomes.

To address this information gap, Concussion Alliance's resource, "Individuals with a Pre-Existing Disability," includes unique resources to support concussion patients navigating the complex interaction of concussion recovery and their disability. The resource (created with CIPS Group Co-Chair Dr. Osman Ahmed and disability advocates) presents a novel first step toward community-specific concussion resources for individuals with disabilities––athletes and non-athletes alike. The resource includes sections on identifying and treating concussions, persisting symptoms, mental health, disability stigma, and navigating healthcare, and a subsection for blind and visually impaired individuals.

The current iteration of the resource focuses on vision impairment, an area in need of urgent measures (Teodoro et al., 2024), but it is constructed to be broadly applicable to individuals with other disabilities. Concussion Alliance, Dr. Ahmed, and disabled advocates plan to continue to expand these resources in the future to include evidence-based, condition-specific resources for other disabilities.

502 Strategy-Based Rehabilitation for Canadian Veterans with mTBI: Results of a feasibility RCT

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ABSTRACT

It is estimated that at least 1 in 20 Canadian Armed Forces (CAF) service members have sustained a traumatic brain injury (TBI) during operational duty (Garber et al., 2014). Many more engage in high-risk activities during individual and collective training: unarmed combat training, pugel fighting, tactical landings, small boat teams in aggressive waves, and routine use of large-caliber munitions all present situations that can transfer force to the brain. Royal Canadian Mounted Police (RCMP) also engage in high-risk training activities. Many Canadian veterans do not seek help for mTBI symptoms. Veterans might not seek help because they are not aware that the symptoms they experienced were from TBI, believe their cognitive challenges are from PTSD, feel that brain injuries are just part of regular military challenges or are only associated with combat, or perhaps most likely, are committed to mission first and consider themselves last. Overall, the estimated prevalence is likely to underestimate the true prevalence of TBI among CAF and RCMP veterans. An RCT of cognitive rehabilitation for military mTBI, the Study of Cognitive Rehabilitation Effectiveness (SCORE) (Cooper et al., 2017), resulted in reductions in functional cognitive complaints. With colleagues from SCORE, we developed a streamlined version of SCORE that retained effective ingredients from the original, was structured to maximize treatment dose over a short time, and could be delivered in person or virtually: Symptom-Targeted Rehabilitation for Concussion (STAR-C). STAR-C is a 4-week, strategy-focused intervention aimed at improving everyday cognitive function, delivered by trained speech-language pathologists or occupational therapists. In a U.S. pragmatic trial, STAR-C was rated as acceptable, appropriate, and feasible by clinicians, veterans, and active duty service members. We adapted STAR-C for the Canadian context, and enrolled 56 Canadian RCMP and CAF veterans in a randomized feasibility and acceptability clinical trial of STAR-C vs. education. Of 24 participants who completed the treatment arm, 19 completed final ratings, and of those 95% "agreed" or "completely agreed" that the treatment was appropriate, acceptable, and feasible. Of the 28 veterans in the treatment arm who completed the COPM, 60% reported better everyday function. Implications for future clinical intervention will be discussed.

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503 The Importance of Augmentative and Alternative Communication Solutions for Determining Cognitive Status in Patients with Severe TBI

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ABSTRACT

Following severe traumatic brain injury (TBI), many patients remain non-verbal for prolonged periods of time. For those who also have severe motoric impairment, communicating even simple yes/no responses via standard modalities, such as talking or gesturing, can be impossible. In these cases, it can be difficult to determine a person's cognitive status, particularly for those who are diagnosed with a disorder of consciousness. Assessments such as the Coma Recovery Scale-Revised (CRS-R) (Giacino et al., 2004) rely on behavioral observations to determine a person's level of awareness at bedside. To test emerged from a minimally conscious state (eMCS), a patient is required to demonstrate functional object use or functional communication. For non-verbal patients with severe motoric impairments, achieving either of these two criteria can be very difficult. Early evaluation and use of Augmentative or Alternative Communication (AAC) can be integral to a patient having the right tools to demonstrate awareness during this phase of recovery. In many cases at our facility, having an accessible AAC modality has been key to a patient demonstrating eMCS on the CRS-R. Through a series of case studies, we will seek to demonstrate how early evaluation and use of AAC can provide important information about a patient's level of consciousness during assessments like the CRS-R. Additionally, we will show how AAC can be a critical component throughout a patient's rehabilitation program by providing a window into their cognitive-linguistic status that otherwise would remain inaccessible.

504 Longitudinal Characterization of EEG Features in Consciousness Recovery Following Severe Traumatic Brain Injury: a Case Series Study

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ABSTRACT

Introduction: Crucial clinical decisions in the acute-to-subacute stages of severe traumatic brain injury (sTBI) are mostly limited to neurological exams and behavioral assessments. While EEG-derived indices of consciousness are promising, their effectiveness in tracking single-subject recovery over time remains to be assessed. This study characterizes the longitudinal progression of consciousness recovery following sTBI, validating EEG spectral power and aperiodic exponent markers, considering sex, etiology and age.

Methods: Four medically stable, non-sedated sTBI patients were selected from an ICU study (7-26 days post-injury). Participants were selected based on etiology (sTBI), age (M = 30 years, SD = 1.41 years), lesion severity (diffuse axonal injury), and behavioral responsiveness levels according to the (Coma Recovery Scale-Revised, CRS-R). Five-minute resting-state EEG and CRS-R assessments were conducted daily for six days, with an additional recording a week after.

Results: Significant variations in power spectral distribution and the aperiodic component were observed over time, even within similar diagnostic categories. The EEG aperiodic component exhibited a similar improvement trajectory to behavioral responsiveness, with a progressive flattening of the EEG slope in two individuals. In contrast, the other two individuals showed aperiodic component fluctuations over time while remaining stable in a CRS-R category. While alpha and theta spatial power distribution did not change as behavioral responsiveness improved, a shift in maximum frequency peak was observed as CRS-R scores improved.

Conclusion: This longitudinal within-subject design captured neurophysiological changes associated with patient-specific trajectories of recovery of consciousness. Spectral power and the EEG aperiodic exponent together, show promise as objective neurophysiological markers for tracking recovery. Identifying individualized EEG markers of consciousness after brain injury could expand therapeutic avenues, improve diagnosis accuracy and aid early outcome prediction.

505 A New Assessment Tool for Post-Traumatic Agitation in ICU Patients with Moderate to Severe Traumatic Brain Injury

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ABSTRACT

Introduction: After moderate-to-severe traumatic brain injury (TBI), critically ill patients are admitted to the intensive care unit (ICU), where they often display agitated behaviours (e.g., aggression, akathisia, and disinhibition), referred as post-traumatic agitation. Post-traumatic agitation not only poses a substantial risk to the healthcare team but can also delay weaning from mechanical ventilation and ultimately hinder patient mobilization (i.e., participation in a rehabilitation program, independent living). Therefore, accurately assessing post-traumatic agitation in the ICU is crucial to ensure patient care that minimizes these risks. Comprehensive assessments of agitation have only been validated in inpatient rehabilitation settings, after the critical agitation period. However, no tool specifically designed to assess and monitor post-traumatic agitation has been validated during the critical period of agitation, which occurs in the ICU.

Objective: To develop a tool specifically tailored to assess post-traumatic agitation in ICU patients with moderate-to-severe TBI.

Methods: A Delphi method was employed to gather expert opinions. Eighteen experts (internist-intensivist, neurosurgeon, nurse, pharmacist, physiotherapist, physiatrist, psychiatrist, respiratory therapist) from various level-1 trauma centers were recruited. Inclusion criteria included having at least five years of experience treating TBI patients and regular exposure to patient post-traumatic agitation. Participants completed a questionnaire regarding their perception of post-traumatic agitation. An in-depth analysis of available instruments to assess post-traumatic agitation was also conducted. A prototype of the tool was developed based on the questionnaire responses and analysis of previous measures. It consists of 10 items representing specific manifestations of post-traumatic agitation, each rated by frequency (1 = almost never, 3 = often) and intensity (1 = disturbing, 4 = dangerous). Frequency and intensity scores are multiplied and summed for a total score out of 108. The tool also tracks interventions (environmental, physical, and chemical), with each targeted behaviour identified by a letter. Nine of the experts participated in a focus group to provide feedback on the prototype, which was revised following experts' feedback and put to a final vote by the same experts.

Results: Questionnaire responses revealed a lack of consensus on onset (e.g., at trauma, while extubating) and duration of post-traumatic agitation, with estimates ranging from hours to weeks. Eighty percent agreed post-traumatic agitation assessment should measure both behaviour frequency and intensity. Eighty percent disclosed using the Richmond Agitation-Sedation Scale, a tool designed for sedation titration that does not fully capture post-traumatic agitation, to assess post-traumatic agitation. Questionnaire and focus group data uncovered ten different post-traumatic agitation behaviours. Consensus was attained for all items, with ≥ 80% agreement in the final vote.

Conclusion: We propose a novel tool developed to comprehensively assess post-traumatic agitation, accounting for the frequency and intensity of behaviours. A pilot study will validate the prototype, adjust items as needed, and verify its predictive validity.

506 Associations Between Concussion Diagnostic Criteria and Acute Abnormal Perfusion Clusters in Pediatric Concussion: A Pedcare+MRI Substudy

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ABSTRACT

The American Congress of Rehabilitation Medicine (ACRM) has recently suggested that mild traumatic brain injury (mTBI) can be classified into separate diagnostic criteria. This investigation aimed to evaluate the association between cerebral blood flow and clinical signs and whether it is moderated by diagnostic criteria.

Methods: This is a substudy of a randomized clinical trial called PedCARE+MRI. Adolescents aged 10-17.99 years presenting to the emergency department within 48h of a diagnosed concussion were recruited. Participants underwent arterial spin-labelling MRI at 72±48h post-concussion to quantify brain perfusion. Perfusion maps were generated for each participant and subject-specific abnormalities variables were calculated, including numbers of clusters exhibiting abnormal hypo- and hyperfusion and the corresponding volumes. Our sample was split into mTBI criterion based on the definition provided by the ACRM. However, since all participants in our sample had at least 1 clinical sign, it was not used as a criteria. Group 1 had one of the following: loss of consciousness, Glascow Coma scale of 13 or 14 or alteration of mental status. Group 2 had ≥ 2 acute symptoms (e.g., headache, mental fog, dizziness, sensitivity to noise) along with either being physically unable to complete the Balance Error Scoring System test or having ≥ 4 errors on the test. Group 3 had ≥ 2 acute symptoms, but no clinical signs, and Group 4 had neuroimaging abnormalities on computed tomography or structural magnetic resonance imaging (if obtained).

A linear mixed effect model was used to evaluate the association of clinical signs and perfusion moderated by mTBI criterion. The model included both sex and age as random effects.

Results: 46 adolescents (46% female, mean age (SD) = 13.16 (2.16) years) were part of Group 1, while 26 adolescents were included in Group 2 (50% female, mean age (SD) = 12.78(1.72) years). No participants met criteria for Groups 3 and 4. Mean time from recruitment to MRI was [Group 1= 3.09(1.36) days; Group 2= 3.21(1.2) days].

We observed a significant interaction between mTBI criterion group and clinical signs on the number of abnormal hyperfusion clusters (beta=13.30, 95% CI [4.87,21.73], t(133) =3.12, p=0.002; Std. beta=0.63, 95% CI [0.23,1.03]). Specifically, individuals within Criterion 1 saw a decrease in clinical signs as the number of abnormal hyperperfusion clusters increased. While those in Criterion 2 saw the opposing trend.

Using abnormal hypoperfusion clusters, no interaction was noted, however a significant positive effect was noted by the number of clinical signs (beta=2.02, 95% CI [0.45,3.59], t(133) =2.55, p=0.012; Std. beta=0.28, 95% CI [0.06,0.49]).

No associations were noted using volume with both abnormal hypo and hyperperfusion data.

Discussion: Within our sample, we were able to utilize perfusion data to differentiate diagnostic criteria groups, as provided by the ACRM.

507 Updated Recommendations for Physical Activity Research after Traumatic Brain Injury

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ABSTRACT

Introduction: A growing emphasis is being placed on the role physical activity plays in improving health outcomes after moderate-to-severe traumatic brain injury (MS-TBI), yet engaging in physical activity behaviors remains a significant challenge. The behavioral epidemiological framework can assist with the systematic review of health-related behavior studies – for the purpose of identifying evidence-based interventions and informing future recommendations – by classifying studies into five unique stages of development. A previous review (2000 - 2012) about physical activity after MS-TBI found that research on behavior change interventions was limited, the field was still in early stages of maturation, and that future research should focus on expanding into intervention and implementation phases. Therefore, we conducted an updated review between 2012 - 2024 to provide updated recommendations for the direction of physical activity research after MS-TBI.

Methods: Articles published between 2012-2024 were retrieved from PubMed, Embase, Ovid Medline, Scopus, Web of Science, Rehabilitation & Sports Medicine Source, and Google Scholar using keywords related to TBI, physical activity, and health promotion. Following epidemiological framework guidelines, two authors independently screened titles, abstracts, and full texts for peer reviewed studies focusing on physical activity research for people with TBI and subsequently categorized the studies, before collectively drawing conclusions about the development of the field and making specific recommendations to guide research direction. If any conflicts occurred across the different stages, they were resolved through critical discussion.

Results: There was a total of 791 references imported, 94 duplicates were removed, 697 were screened with title/abstract, 151 articles underwent full text review, and 91 final studies were retained based on the inclusion criteria. Several studies were excluded from this review (n = 35/60) because they did not separate results by condition or injury severity (i.e., stroke/mild TBI). 40% of the remaining studies were categorized in phase 1 (establishing connections between behavior and health); 7% in phase 2 (developing methods for measuring behaviors); 43% in phase 3 (examining factors that influence behavior); 10% in phase 4 (evaluating behavior change interventions); and 0% in phase 5 (dissemination of health promotion programs).

Discussion: The types of outcomes, measures, behavior-change frameworks, strategies to increase physical activity, and lack of implemented programs will be discussed. Even though a greater number of studies were found in phases 3 and 4 compared to the previous review, the absence of studies in phase 5 indicates an opportunity for greater implementation science efforts. Recommendations from the current review will be provided to enhance the development of basic physical activity research after MS-TBI through to policy and program implementation.

509 Determining the Association between Adverse Childhood Experiences, Cognition, Neurobehavioral, and PTSD Symptoms among Women with Exposure to Intimate Partner Violence-Related Head Trauma

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ABSTRACT

Introduction: Globally, one in three women experience intimate partner violence (IPV). The injuries to the head, neck, or face common in physical IPV confer high risk for IPV-related head trauma (IPV-HT), or probable brain injury (IPV-BI). Researchers have hypothesized that both past and current stressors can impact brain functioning and promote persistent functional difficulties after HT and BI. Understanding how past stressors, such as adverse childhood experiences (ACEs; e.g., abuse, neglect, and challenges within the household), may affect cognition, neurobehavioral symptoms, and posttraumatic stress disorder (PTSD) symptom burden among individuals who have experienced IPV-HT is essential for screening and improving the prognostic accuracy.

Methods: For a broader study, 98 women (aged 19-59 years) with a history of exposure to IPV-HT completed self-reported measures: 1) ACEs 10-item questionnaire, 2) Brain Injury Screening Questionnaire IPV Module (BISQ-IPV), 3) Rivermead Post-Concussion Symptoms Questionnaire (RPQ), 4) Neuro-QoLTM (Quality of Life in Neurological Disorders) Cognition v2, 5) PTSD Checklist for DSM-5 (PCL-5), and 6) Conflict Tactics Scale Revised (CTS2). Questions from the BISQ-IPV probing loss of consciousness

or feeling dazed/confused after HT were used to determine severity, per American Congress of Rehabilitation Medicine guidelines, and time since most recent IPV-HT injury. Total RPQ score determined neurobehavioral symptom severity. Neuro-QoL Cognition T-score determined perceived difficulty in cognitive abilities. Total PCL-5 score determined PTSD symptom severity. CTS2 determined severity of IPV in the past year. We constructed separate linear regressions to determine the effect of total ACEs and IPV-HT severity on 1) RPQ total score, 2) Neuro-QoL T-score, 3) PCL-5 total score, while adjusting for past year IPV exposure (CTS2), time since most recent IPV-HT injury, and age.

Results: Greater total ACEs score predicted higher RPQ total score ($p<0.001$), lower Neuro-QoL Cognition T-score ($p=0.002$), and higher PCL-5 total score ($p=0.004$). Greater IPV-HT severity only predicted higher RPQ total score ($p<0.001$).

Discussion: Both greater exposure to ACEs and IPV-HT severity were significant predictors of neurobehavioral symptoms. However, only greater ACEs were significantly associated with more perceived difficulty with cognition and greater PTSD symptom burden among women with a history of IPV-HT. Previous work has shown that heightened baseline mental health concerns (e.g., increased PTSD symptom severity) increase the risk for greater, and persistent, functional difficulties after BI. Thus, it is possible that ACEs place individuals at higher risk for greater neurobehavioral symptoms and cognitive difficulties due to their potential influence on brain development, stress responses and PTSD symptoms. Future work should explore the relationship between ACEs, neurobehavioral, and PTSD symptoms among individuals with IPV exposure longitudinally to demonstrate any causal relationships.

511 A Pilot Study: The Link Between Perceptual-Cognitive Skills and The Prevention of Sport Related Concussions in Ice Hockey

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ABSTRACT

Context: Athletes playing contact sports are at risk of sustaining a sport-related co

ncussion (SRC) due to the high prevalence of impacts, especially head impacts. More specifically, ice hockey players are at increased risk as it is estimated that they can sustain over 200 head impacts per season. Given the potential consequences of sustaining a SRC on athletes' wellbeing, preventative strategies are warranted to protect their health. Avoiding impacts requires proper tracking and awareness of surroundings to allow for game analysis and obstacle detection, all of which are based on perceptual-cognitive skills. As such, it can be hypothesized that perceptual-cognitive skills may aid in the prevention of repeated head impacts in ice hockey.

Methods: University level varsity male ice hockey players, from the Université du Québec à Trois-Rivières (UQTR) Patriotes, were recruited for this study. Baseline perceptual-cognitive skills were assessed during the pre-season period (August 2023) through three-dimensional multiple-object-tracking, using a commercialised tool called NeuroTracker. For the first 8 games of the regular season (2023-24), the participants' helmets were each fitted with CUE sport sensors to log the quantity and quality of head impacts that the participants were subjected to in game context. The number of head impacts (i.e., quantity), as well as their intensity metrics (i.e., quality) were recorded.

Results: The sample consisted of 9 participants (average age: 23.67 ± 1.58 years) with an average weight of 86.64 ± 4.99 kg. The sample's mean NeuroTracker score was of 1.51 ± 0.26 m/s. For all participants combined, the cumulated magnitude of the sustained head impacts over 8 games averaged 581.33 ± 245.79 G and ranged from 290.00 G to 988.00 G, the cumulated number of impacts averaged 63.00 ± 20.67 impacts and ranged from 32.00 impacts to 96.00 impacts, and the cumulated HIC score averaged 149.59 ± 97.67 and ranged from 45.84 to 326.93. No significant associations were observed between the NeuroTracker scores and the three different variables of interest when analysed with Pearson correlation tests.

Conclusions: The results of this pilot study suggest that perceptual-cognitive skills did not play a role in the prevention of repeated head impacts in this sample, as no significant correlations were observed between the NeuroTracker scores and the variables of interest (i.e., number of head impacts, magnitude of impacts, and HIC scores). Results may have been affected by the small sample size and the short time frame. Since there is a great potential for clinical applications in the prevention and rehabilitation of SRC through the improvement of perceptual-cognitive skills, future study should involve a larger sample, and data should be analyzed over one full season to better understand the role of perceptual-cognitive skills on head impact prevention.

512 Group Yoga And Group Low-Intensity Exercise Facilitate Distinct Personal Factor Changes In Individuals With Acquired Brain Injury: A Qualitative Descriptive Study

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ABSTRACT

Introduction: Rehabilitation practitioners often use mobility-based interventions that target impairments and limitations in the 'body structure and function' and 'activity' domains within the World Health Organization's International Classification of Functioning and Disability (WHO-ICF) framework. However, the impact of mobility-based interventions on the WHO-ICF domain of 'personal

factors', including changes in the individual's features like motivation, self-acceptance, and mindfulness is lesser known. Subsequently, the primary aim of this study was to explore differences in perceived 'personal factor' changes among individuals with acquired brain injury (ABI) completing two mobility-based interventions: group yoga and group low-intensity exercise.

Methods: This qualitative descriptive study included participants who completed either group yoga or low-intensity exercise, twice a week for eight weeks during a pilot randomized controlled trial. Demographic data were collected from 18 of the 29 eligible participants who completed in-person interviews or focus groups. A semi-structured interview guide, informed by the WHO-ICF framework, was used during interviews to explore perceived changes in 'personal factors.' Interviews were audio-recorded, transcribed, and then analyzed using three approaches. First, we thematically analyzed the transcripts through inductive, open coding. Second, we completed a deductive application of codes to WHO-ICF domains and categories. Lastly, using the constant comparison technique, we analyzed the WHO-ICF categories coded for yoga participants compared to exercise participants.

Results: Eighteen participants completed interviews; 9 from yoga (Mean age= 62.0 + 15.6, Mean years-since-injury= 17.8 + 19.0, 6 females) and 9 from low-intensity exercise (Mean age= 47.6 + 22.5, Mean years-since-injury= 5.5 + 5.9, 4 females). When comparing the intervention groups, two themes related to changes in 'personal factors' were generated: 1) Engagement in a Group Yoga Intervention Increased Participants' Self-Regulation as They Learned to be More Mindful and Responsive to Their Bodies' Needs. A participant stated, "Jen [yoga instructor] has taught me to listen to my body and just listen. . .I have learned that listening to my body, and honoring it [means] I'm not always following the instructions." 2) Individuals Participating in Group Low-Intensity Exercise Report Increased Motivation to Prioritize Fitness. A participant stated, "I feel like [exercise] has given me a little more motivation in my everyday life to be a little bit more active."

Discussion: These findings suggest that group yoga and group low-intensity exercise may facilitate distinct 'personal factor' changes for individuals with ABI. Participants in group yoga reported improved self-regulation, while those in group exercise experienced increased motivation. Despite interventions having the same dosage, differences in setting/approach likely influenced distinct outcomes. Yoga's quiet setting and focus on the mind-body connection may have promoted self-regulation, whereas the familiar, socially engaging format of low-intensity exercise likely boosted motivation. Future research should incorporate objective measures of self-regulation and motivation to quantify these perceived 'personal factor' changes.

513 Development of Training Competencies for Supporting Justice-Involved Youth with Brain Injury: Project BJUST

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ABSTRACT

Objective: The objective of this presentation is to describe the empirical development of training competencies, organized across six domains (knowledge, screening, eligibility, assessment, intervention, and community reentry), for service provision to justice-involved youth experiencing a brain injury. We will detail each phase of the process and discuss dissemination strategies and suggestions for use in practice.

Significance: Community reentry outcomes for formerly incarcerated youth are significantly worse for youth with brain injury than for their peers without disabilities. Research has illustrated that youth with brain injury in juvenile corrections are not receiving the support they need to achieve positive outcomes, possibly because most staff in juvenile correction facilities lack the knowledge and skills they need to adequately support these youth. To address the urgent need for staff training on evidence-based practices that can successfully improve the transition and life outcomes of justice-involved youth who experience brain injury, we developed a set of professional development training competencies for correctional staff in supporting these youth. This was done through an exploratory research project designed to empirically define the training needs and core competencies that juvenile services personnel require to work successfully with justice-involved youth with brain injury and define professional development standards to address those identified needs.

Methods: Using stakeholder and community input, this research project was implemented across three phases. In Phase I, we conducted and analyzed data from a series of qualitative interviews of key stakeholders in juvenile corrections across the country. During Phase II, findings from Phase I data were used to develop a comprehensive training needs survey for nation-wide dissemination to juvenile facility personnel (e.g., counselors, teachers, residential staff, health care providers). Finally in Phase III, we used the focus group and survey results to conduct an iterative Delphi survey procedure to identify empirically based competencies for training correctional staff working with youth with brain injury in correctional settings.

Results: This process resulted in a set of 44 training competencies split among the six domains of (a) knowledge, (b) screening, (c) eligibility, (d) assessment, (e) intervention, and (f) community reentry. The Delphi process also determine which competencies were most relevant and important for which roles in juvenile settings, including administration, line staff, education staff, residential staff, behavioral health staff, physical health staff, vocational staff, and parole and probation staff. Each phase of the process will be shared as well as the resulting competencies and dissemination plan. Attendees of this session will understand the need of youth with brain injury in correctional settings, understand the process of developing training competencies for staff within correctional settings on supporting youth with brain injury, and

understand strategies for implementing these training competencies in practice.

514 The Use of Virtual Reality for Activities of Daily Living Rehabilitation

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ABSTRACT

Introduction: Sustaining an acquired brain injury (ABI) can have long-term and catastrophic consequences (i.e., physical and cognitive changes). Importantly, people experience difficulty completing their activities of daily living (ADL) after injury. To facilitate improvement in ADLs, rehabilitation needs to be customized to the person's function, goals, and environment. Virtual reality (VR) is a novel treatment approach in ABI rehabilitation that aims to improve physical and cognitive deficits using a tailored and individualized approach. Specifically, the Saebo-VR is a platform with ADL tasks (i.e., grocery shopping, meal preparation) designed for people with ABI to improve physical, cognitive, and ADL function. However, the feasibility of using a VR device such as the Saebo-VR in clinical settings is not known.

Objective: To explore the feasibility of using VR to practice ADLs to improve physical (i.e., upper limb), cognitive, and ADL function after ABI.

Methods: A mixed methods pre- and post-intervention study was conducted using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework. Participants included people with ABI (i.e., stroke and moderate-to-severe traumatic brain injury) within 1-year of injury receiving inpatient or outpatient therapy at a rehabilitation centre. Participants with ABI participated in 12 30-minute VR sessions over 3-weeks using the Saebo-VR to practice ADLs. Occupational therapist (OT) participants were recruited to facilitate sessions. The sessions were facilitated by OTs or trained research staff. Outcome measures were collected at baseline, post-intervention, and at 3-months post-intervention. The primary outcome measure was the Nottingham Extended ADL scale and secondary outcome measures included the Montreal Cognitive Assessment, Fugl-Myer Upper Extremity Scale, and Daily Living Self-Efficacy Scale. Facilitators video-taped 3 out of 12 sessions and completed checklists to ensure fidelity. Phenomenological semi-structured qualitative interviews were conducted with participants and OT facilitators to understand their experience during the VR sessions.

Results: 15 participants (mean age 46.8, 10 male) with ABI (2 severe TBI and 13 stroke) and 5 OTs (mean age 37.8, 5 female) were recruited. All feasibility indicators were achieved. For reach, 23.1% participants with ABI and 56% of OT participants were included in our study. For effectiveness, paired t-tests indicated improvements from baseline to post-intervention. For adoption, participants with ABI outlined barriers with VR included unfamiliarity with technology; facilitators included realizing the impact of the intervention on ADL function. OT participants indicated barriers to facilitation included resource constraints; facilitators included seeing value of VR in occupational therapy. Implementation was assessed by the videos and checklists and revealed high fidelity. Maintenance was assessed post-intervention, and 60% of OT participants revealed they would use VR clinically in the future.

Conclusions: Determining the feasibility of VR in clinical practice with the ABI population may provide evidence for the use of novel approaches in therapy to enable engagement in daily activities.

515 Return to Sports After Pediatric Traumatic Brain Injury: An Expert Panel Survey

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ABSTRACT

For children who sustain traumatic brain injury (TBI), there are no evidence based guidelines to help clinicians make return to play (RTP) decisions if the injury was anything more severe than a mild TBI. Accordingly, we sought to understand the practice patterns of experts in pediatric traumatic brain injury (TBI) in relation to how they assess severity of TBI and guide RTP decisions with their patients who sustain complicated mild, moderate, or severe TBI.

We conducted a cross-sectional web-based survey of experts (defined by attesting to their clinical management of children with TBI including RTP decisions and demonstrating a history of publication in the area of pediatric TBI including mild TBI). 55 candidates were invited, and 37 responded (67% response rate). 30 met eligibility criteria and answered our complete survey, representing the medical specialties of physical medicine and rehabilitation, neurology, neurosurgery, sports medicine, and neuropsychology.

Our outcome measures included ratings of agreement as to the relative importance of a variety of factors used to assess initial severity of injury as well as to measure recovery. RTP timelines were measured for different scenarios assuming the child had completely recovered (adjusted by level of risk of activity returned to and the severity of initial injury sustained). Finally, ratings of agreement with various factors which could influence their RTP decision making as well as a free text option.

Recommendations on RTP timing varied significantly based on risk of activity returned to for all levels of TBI severity ($p < 0.05$). There was large variability of RTP timeline for any given level of injury severity. There was no significant association between medical specialty and RTP recommendations. Factors necessitating a longer duration before allowing RTP and which received 80% or greater agreement (noted agree or strongly agree) included: degree of recovery which does not reach pre-injury baseline (93%), higher degree of contact/risk in the sport of interest (90%), the requirement of surgical intervention (82%), and returning to a competitive as opposed to a recreational playing environment (80%).

In conclusion, these results can inform clinicians who care for children with TBI in their own RTP decision making. The description of these RTP trends, in combination with the variability seen in both severity determination and recovery assessment, highlight the importance of further study of outcomes related to RTP and the eventual development of standardized guidelines for this patient population.

516 Assessing the Validity of a Multimodal Exertional Test (MET) for Sport-Related Concussion: Differences in Responses Between Athletes with a Sport-Related Concussion and Healthy Athletes

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ABSTRACT

Background: Concussion management and return-to-play /sport medical decisions have evolved and now include exertional testing. We developed a multimodal exertional test (MET) requiring minimal resources and are assessing its validity.

Purpose: To examine physiological and subjective responses, and failure rates between healthy athletes and athletes with concussion on the MET.

Methods: In this prospective observational study, 116 healthy intercollegiate athletes (females=49, males=67) underwent the MET at a baseline assessment. Meanwhile, 49 athletes with concussion (females=36, males=13) completed the MET at various intervals post-injury (1, 2, 3, 4, 6, and 8 weeks). The study evaluated average and peak heart rates, changes in symptoms, and pass/fail outcomes of the MET. Advanced Bayesian hierarchical modelling techniques were employed to differentiate group responses.

Results: Overall, average and peak heart rates were identified to increase from pre-MET to Stage 1 (average heart rate difference = 25.4 beats per minute [bpm], 90% Credible Interval [90% CrI] = 17.0 – 33.3 bpm; peak heart rate difference = 28.6 bpm, 90% CrI = 20.3 – 36.4 bpm), maintain increased between Stages 1-3, and increase again from Stages 3-4 (average heart rate difference = 10.9 bpm, 90% CrI = 1.0 – 20.7 bpm; peak heart rate difference = 15.7 bpm, 90% CrI = 25.3 – 35.0 bpm) for healthy athletes. A similar pattern was identified in athletes with concussion who were able to successfully pass the MET. Additionally, female participants had higher average and peak heart rates compared to male participants (average heart rate difference = 4.0 bpm, 90% CrI = 1.1 – 6.7 bpm; peak heart rate difference = 4.4 bpm, 90% CrI = 1.1 – 7.7 bpm). Minimal changes in symptom provocation were identified in healthy athletes following each task, however symptom exacerbation was found in athletes with concussion. At 1-, 2-, 3-, and 4-weeks post-injury, 53%, 48%, 24%, and 16% of athletes with concussion failed the MET, respectively, although no healthy athletes failed.

Conclusions: While physiological responses to the MET were consistent across groups, athletes with concussion exhibited symptom provocation and higher failure rates. These findings underscore the potential of the MET in enhancing concussion management strategies by providing a nuanced understanding of recovery trajectories and readiness for safe return to play.

517 Effect of Subconcussive Head Impacts on the White Matter Microstructure of Contact Sports Athletes

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ABSTRACT

Introduction: Emerging evidence suggests that direct or indirect impact on the head alters white matter (WM) tract integrity even without clinical symptoms. Long-term exposure to repetitive sub-concussive impact has been associated with neurocognitive impairments, with or without a defined impact injury. Diffusion Tensor Imaging (DTI), an advanced Magnetic Resonance Imaging, has been used to study structural changes in the brain by quantifying the direction and

magnitude of water diffusion in the WM tracts and the brain. This study aims to use DTI to characterise the effect of playing a season of contact sports on brain microstructure among contact sport athletes (1) relative to baseline scans and (2) non-contact sport athletes.

Methods: Thirty-three male contact sports players underwent brain scans (3.0 T GE MRI scanner, multi-shell diffusion MRI, and 3D-T1w sequences) at three-time points: (1) pre-season, (2) mid-season, and (3) post-season. Twenty age-matched non-contact sports male athlete controls underwent a single timepoint scan at baseline. Diffusion images were preprocessed using FMRIB's Diffusion Toolbox, and diffusion tensors were reconstructed using Mrtrix3. Tract-based Spatial Statistics (TBSS) was used to compare diffusion metrics - fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD), and radial diffusivity (RD) - between groups. Independent t-tests compared controls and contact sport players across three-timepoints, while paired t-tests assessed within-group changes in contact sport players between two-timepoints. Cohen's d (d) was used to quantify the effect size of differences between groups in the identified significant cluster, while its size is expressed as a percentage of the whole WM skeleton, which TBSS compared across subjects.

Results: TBSS identified significant clusters, where compared to the control group, RD was higher for rugby players in postseason ($p < 0.05$, $d = 1.182$, 4.24%), and FA was lower in midseason ($p < 0.05$, $d = 1.986$, 1.55%), and postseason ($p < 0.05$, $d = 1.733$, 13.85%). Prominent WM tracts identified to be significantly different were the left internal and external capsule and left cerebellar peduncle. Significant clusters were identified more in the left hemisphere than in the right hemisphere of the brain. No significant difference was found for other comparisons.

Conclusions: Our results reveal statistically significant differences in white matter microstructure between rugby players and non-contact sport athletes, particularly within the left internal and external capsule and left cerebellar peduncle. Elevated RD and reduced FA values indicate potential disruption or damage to white matter integrity, likely influenced by repetitive head impacts. These findings emphasize the importance of continuous monitoring of brain health in contact with sport athletes to better understand the long-term effects of repeated sub-concussive events. Further study is warranted to characterise the effect of contact sports on brain microstructure in association with head impact measures and brain development in adolescents.

518 Intervention and Implementation Strategies in Acquired Brain Injury Peer Support Programming: A Scoping Review

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ABSTRACT

Introduction: Acquired brain injury (ABI) is the leading cause of disability in Canada for people under 40 years old. Despite the prevalence and high needs of the ABI population, current health services often do not provide individualized and patient-oriented support to facilitate improved longer-term quality of life outcomes. Peer support is a patient-oriented intervention, directly tailored to addressing the needs of the person, which is especially important given the diversity of symptoms and outcomes experienced after ABI. This review aimed to describe the intervention and implementation strategies of peer support after ABI.

Methods: The scoping review used the Arksey and O'Malley methodology framework, with the search conducted in March 2024. Databases CINAHL, EMBASE, Medline, and PsycINFO were searched. The Reach Effectiveness Adoption Implementation Maintenance (REAIM) framework was used to describe implementation strategies. Peer-reviewed articles were included if they described at least 4 out of 5 REAIM components with both one-on-one and group support programs included. Articles were included if participants were adults and a majority of those with lived experience of brain injury. Articles were excluded if peer support was a formal program run by a healthcare professional, self-management oriented, or a control arm.

Results: Selected key results are highlighted from our analysis. The search yielded 2353 articles with 16 articles included in the review after two independent reviewers completed title and abstract screening and full text screening, excluding duplicates and those not meeting inclusion criteria. Of the 16 articles included in our review, there were nine unique peer support interventions described. Feasibility outcomes were mixed across the studies. The reach of interventions (e.g., participants recruited compared to those approached) had a large range from 20% to 93%. Effectiveness outcomes were mixed; two interventions reported significant improvements in quality of life and interpersonal support after peer support compared to controls. Qualitative studies all reported positive experiences from those who received peer support. Qualitative themes included increased knowledge and confidence after injury, and a sense of comfort from connections formed. Adoption of interventions was obtained through interventions engaging with hospitals (n = 5 interventions) and community brain injury associations (n = 6 interventions). Implementation approaches of peer training varied from one-day to one week of training or shadowing current peer support workers, while other did not have any training (n = 2 interventions). Pairing the peer support worker to the peer support receiver was based on sex and gender, similar life experiences, and similar symptoms. Maintenance of peer-support programs beyond the research study took place for six of the interventions.

Conclusions: This scoping review identified ABI peer support programming implementation strategies. The

heterogeneity identified highlights the complex nature of both peer support programming and introducing interventions in the ABI populations.

519 Comparing how People with Stroke and Traumatic Brain Injury Respond to the Diabetes Prevention Program

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ABSTRACT

Introduction: Brain injury may occur from traumatic – external damage to the brain, or non-traumatic causes – internal damage to the brain, such as cerebrovascular accident (CVA) or stroke. Both CVA and traumatic brain injury (TBI) are leading causes of death and disability around the world and are further associated with comorbid chronic health conditions such as heart disease, hypertension, diabetes, and other significant cardiometabolic risk factors. Lifestyle behavior interventions, such as the diabetes prevention – group lifestyle balance (GLB) program, are the cornerstone of effective treatment for cardiometabolic conditions and although CVA and TBI share many similarities in pathology, the different mechanisms of brain injury and resulting cognitive and behavioral changes associated with brain damage are not always well understood. There was a need to examine the characteristics (e.g., biopsychosocial factors) that contribute to CVA and TBI responses to the GLB program to inform future adaptations and equitable health outcomes. The purpose of this secondary analysis was to combine data from two 12-month randomized control trials (GLB-CVA and GLB-TBI) to examine how the association and temporal relationship between weight change and biopsychosocial factors (demographic, injury-related, physiological, and self-report outcomes) differed for participants with CVA and TBI.

Methods: All participants from the GLB-CVA/TBI studies with 12-month follow-up study data were included. Demographic characteristics were summarized with standard descriptive statistics and compared between groups using t-tests or ANOVA tests for categorical variables and Pearson's correlation for numerical variables. Outcome variables were evaluated using general linear models to assess the correlation between weight change and variables. Regression analysis was conducted using variables that had a p-value of ≤ 0.1 from the demographics and biomarkers or self-report outcomes. Analyses were performed using SAS 9.4 with a significance level of 0.05.

Results: There were 69 (45 CVA, 24 TBI) participants who completed 12-month follow-up assessments and were included in this secondary analysis. Overall, participants with TBI (-15.5 lbs. ± 16.4) responded more favorably to the GLB intervention than people with CVA (-10.1 lbs. ± 16.8) at 12-month follow-up. When groups were combined, statistically significant associations with weight-change were identified for race and insurance. Evaluation of the variables between baseline measures and corresponding change in weight identified a significant association for the Six Minute Walk Test at 12-months. Combined regression analyses demonstrated that variables with a $p < 0.05$ showed a positive relationship with weight change, including 8 Year Diabetes Risk and Six Minute Walk Test.

Discussion: Implications about differences in weight-change based on diagnosis will be discussed, in addition to how factors related to racial background and health insurance can potentially influence individual responses to the diabetes prevention program.

520 The Relationship Between Illness Beliefs and Treatment Outcomes for Persisting Concussion Symptoms

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ABSTRACT

Background: There is growing recognition that illness beliefs are related to symptom burden after concussion and provide a target for treatment. Studies have shown that changes in illness beliefs are possible although it is not clear if this relates to a reduction in concussion symptoms. This study examined the relationship between illness beliefs and changes in concussion symptoms during a multidisciplinary concussion treatment program.

Methods: A retrospective observational design was used to examine data from an outpatient multidisciplinary treatment clinic for delayed recovery after concussion from 2015-2024. Treatments included rehabilitation medicine, psychology, physiotherapy, exercise physiology, occupational therapy, speech pathology, and dietetics. Inaccurate or unhelpful illness beliefs about concussion were generally targeted by all therapists using psychoeducation, and specifically by psychologists using approaches such as cognitive behaviour therapy. Participants were included in the analysis if they had completed admission and discharge measures of symptoms using the Post Concussion Symptom Checklist (PCSC), and the Brief Illness Perception Questionnaire (BIPQ) at least once on admission. Regression analyses examined the relationship between illness beliefs and reduction of symptoms across treatment whilst controlling for a range of covariates including demographics (e.g. gender, age), injury characteristics (e.g. time since injury) and co-occurring symptoms (e.g. depression, anxiety).

Results: Data was available for 374 participants. Of the sample, 54% were female with mean age of 38.6 years, and admission to the treatment program was on average 197.6 days post concussion. Treatment period was on average 192.9 days, with mean symptom scores on PCSC reducing from 55.3 on admission to 26.6 on discharge. Regression analyses showed that baseline illness beliefs on BIPQ (total and domain) were not related to the symptom reduction from admission to baseline. In contrast, using a subset of 231 participants who

completed BIPQ at baseline and discharge showed that negative illness beliefs significantly reduced across the treatment period, and reduction in negative illness beliefs on BIPQ was related to greater reduction in symptoms on the PCSC.

Conclusions: Changes in illness beliefs were related to concussion symptom reduction in a multidisciplinary clinic, however, baseline degrees of illness beliefs were not. This supports treatments for delayed concussion recovery that focus on changing illness beliefs, and that baseline levels of negative illness beliefs may not be a good predictor of treatment outcome. Controlled studies are needed to more rigorously examine the relationship between illness beliefs and concussion symptoms.

521 Management Of Concussion by General Practitioners – A Pilot Survey Study

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ABSTRACT

Background: Concussion following sports and other injuries is a growing concern in the community. General practitioners (GPs) are at the forefront of diagnosis and management of concussion although little is known about their practices in this role. This study used a survey to explore GP approaches to concussion management care, knowledge of relevant guidelines, and confidence in care.

Methods: A cross-sectional online survey design was used. The survey was designed with GP input and was disseminated to Australian GPs via websites and email lists for the Australian College of General Practitioners and local GP networks primarily based on Victoria. Descriptive statistics were used to explore survey findings, while associations between responses were examined using effect size calculation and chi-square significance testing.

Results: The survey was completed by 33 Australian GPs with on average 12 years of experience in working as a GP. The majority were based in the state of Victoria and in metropolitan settings, with more than half seeing 4-6 patients for concussion in the past 12 months and sports being the most frequent injury mechanism. Over 90% of GPs reported moderate or high levels of confidence in diagnosing concussions and providing initial advice and management, compared to about 40% for managing patients who are slow to recover from concussion. About 70% reported using clinical guidelines as a main source for guiding their concussion care, with varying approaches to practice reported. GPs primarily used clinical interview and neurological examination to assess for a suspected concussion, with balance testing and neck exam used frequently by about half, and standardised concussion tests (e.g. SCAT) or cognitive measures only used frequently by about one quarter of respondents. About half of the respondents recommend rest until patients were asymptomatic and that having a concussion was likely to cause longer term brain issues. The length of recommended rest after a concussion (e.g., 48 hours vs. until asymptomatic) was moderately linked to whether GPs relied on clinical guidelines as a primary information source. All participants indicated a desire for further training and education on concussion.

Conclusions: This pilot study highlights varying practices in relation to the GP assessment and management of concussion including the recommended period of rest after concussion. Delayed recovery after concussion was identified as a key challenge for GPs and there is a desire for further training. Future work will use interviews to unpack these findings which will inform subsequent surveys and concussion education needs for GPs.

522 Variations in Adherence to Recommendations for The Management of Moderate to Severe Pediatric TBI in Canada

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ABSTRACT

Introduction: Traumatic brain injury (TBI) is the leading cause of trauma-related death and disability in children. Evidence suggests that there are gaps in the quality of care provided to almost half of all pediatric trauma patients in Canada. Lack of adherence to clinical practice guidelines (CPG) recommendations may be due to lack of knowledge about their existence, their heterogeneity or the concern about their quality. Currently, no data addressing the adherence to CPG recommendations for moderate or severe pediatric TBI in Canada or in variations in practice are available. The objectives of this study are to estimate the adherence to recommendations for children under 16 years old admitted to a Canadian hospital center with moderate to severe TBI and to evaluate inter-hospital and interprovincial variations in adherence to these recommendations.

Methods: We conducted a multicenter retrospective cohort study using the hospitalization data for children under 16 years old with the diagnosis of moderate to severe TBI in all Canadian provinces except Quebec provided by the Canadian Institute for Health Information between January 1, 2016 and March 31, 2020. To measure adherence to recommendations for moderate to severe pediatric TBI, we iteratively created coding algorithms based on the available literature and clinical experts views. We carried out multilevel logistic regression models adjusting for potentially confounding variables such as age, sex, severity and concomitant injuries. Interclass correlation coefficients obtained from

multilevel random intercept logistic regression models were used to quantify inter-hospital variations. Odds ratios using Ontario as the reference (most populous province) were used to quantify inter-provincial variations.

Results: We developed coding algorithms for the following recommendations: emergency department (ED) waiting time of less than 4 hours, admission/transfer to pediatric center, intensive care unit (ICU) admission, CT-Scan and other imaging techniques, mechanical ventilation, neurosurgical interventions (intracranial pressure monitoring, decompressive craniectomy and cerebrospinal fluid drainage) and measurement of GCS in children over 3 years old. There are significant differences between provinces regarding only two recommendations: ED waiting time of less than 4 hours and admission/transfer to pediatric center. Significant differences between hospitals within the same province for several recommendations were also registered regarding ED waiting time of less than 4 hours, ICU admission and cerebrospinal fluid drainage.

Conclusion: Our study is the first to describe adherence to CPG recommendations for the management of moderate to severe pediatric TBI in Canada. There are interhospital and interprovincial differences in the application of several recommendations.

523 Launching the Qualitative Extension to a Telehealth-Delivered Randomized Control Trial Testing the Efficacy of the Diabetes Prevention Program after Traumatic Brain Injury

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ABSTRACT

Background: Obesity is a problem after moderate-to-severe traumatic brain injury (TBI) and associated with a myriad of chronic health problems, including cardiometabolic syndrome, chronic obstructive pulmonary disease, myocardial infarction, and type 2 diabetes. A promising evidence-based Diabetes Prevention Program Group Lifestyle Balance (GLB-TBI) intervention was specifically adapted for this population and its efficacy was shown across a randomized control trial (RCT) with 17.8 ± 41.4 lbs. of weight lost (7.9%), high participation rates (89.6%) across the 12-month program, and significant improvements in diastolic blood pressure, triglycerides, and HDL cholesterol. To expand and increase accessibility to the GLB-TBI, the efficacy of a telehealth-delivered (tGLB-TBI) is currently being tested through a national-level RCT. However, a wide range of program-related phenomena, including perceived experiences and facilitators and barriers to engagement with the tGLB-TBI remain unknown and critical to successful implementation.

Objective: The objective of this qualitative study is to extend findings from the current RCT by providing an in-depth, multi-faceted exploration of participant and coach perspectives to obtain a better understanding about the experiential outcomes in the national study and identify information required to optimize telehealth delivery of the program in the future.

Methods: We adopted an exploratory case study approach through an interpretivist paradigm, which focuses on discovering realities about the study across participants' and coaches' backgrounds, views, and experiences. Audio-recorded 60-90-minute focus group and individual interviews with consenting program participants and coaches (n = 2 - 6) are being conducted through Teams videoconferencing software within a month of completing the final assessment of the 12-month intervention. To-date, the first of four cohorts have been completed. Reflexive thematic analysis of the transcribed audio-recorded data is being used to analyze, and report patterns (themes) within and across participant and coach experiences in the program.

Results: To capture perceived changes/similarities across cohorts, intra-analysis themes are developed within each cohort before developing themes across cohorts. Preliminary results from reflexive thematic analyses within the first cohort will be shared. Five participants (4 male, 1 female) and the two coaches (2 female) who deliver both programs were included. Themes related to the influence of program leaders, the range of program-related benefits after TBI, and how participant identity affects engagement were generated.

Discussion: Perceptions about program experiences, engagement, and outcomes in the first cohort identified how the telehealth-delivered intervention led to meaningful activities and buy-in from all parties. Insights drawn from how themes correspond to inner mechanisms of change will be discussed, in addition to implications for future research and practice related to telehealth-delivered health-behavior programs for people with TBI.

524 Examining Associations Between Cannabis Use And Neuropsychiatric Symptoms In A Sample Of Former American Football Players: Findings from the DIAGNOSE CTE Research Project

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ABSTRACT

Background: Traumatic encephalopathy syndrome (TES) is a progressive clinical disorder associated with substantial exposure to repetitive head impacts (RHI), including symptomatic concussive and asymptomatic subconcussive injuries often incurred during routine contact and collision sport participation. A core clinical feature of TES is neurobehavioral dysregulation (NBD), a neuropsychiatric syndrome characterized by poor regulation of emotions and behavior. Given the potential anti-inflammatory properties of cannabis, recent clinical studies have begun to examine its use for the management of neuropsychiatric symptoms associated with various neurological conditions, including dementia and traumatic brain injury. Preliminary evidence suggests that cannabinoids may be associated with clinically significant improvements in several dementia-related neuropsychiatric symptoms (e.g., agitation, aggression), though findings have been equivocal. The present observational study examines the association between cannabis use and NBD among former athletes with substantial RHI exposure.

Methods: Participants were former professional (n=115) and college (n=59) American football players (ages 45-74 years) enrolled in the Diagnostics, Imaging, and Genetics Network for the Objective Study and Evaluation of Chronic Traumatic Encephalopathy (DIAGNOSE CTE) Research Project. Measures of NBD (explosivity, emotional dyscontrol, affective lability, impulsivity) were derived from an expert-informed confirmatory factor analysis with items from self-reported neuropsychiatric rating scales. Participants were categorized into four groups according to self-reported cannabis use: "never-users" (n=57), "former users" (n=80), "occasional users" (n=23), and "frequent users" (n=19). Uncontrolled, one-way ANOVAs were used to examine group differences in NBD symptoms, and post-hoc analyses were performed using Tukey's HSD.

Results: There were significant group differences in explosivity, $F(3, 173)=4.23$, $p=.006$; impulsivity, $F(3, 173)=5.04$, $p=.002$; affective lability, $F(3, 173)=5.92$, $p<.001$; and in a total NBD score, $F(3, 173)=5.86$, $p<.001$. Post-hoc analyses revealed that frequent cannabis users had significantly higher impulsivity, affective lability, and total NBD factor scores compared to all other cannabis use groups. Additionally, frequent cannabis users exhibited higher explosivity factor scores compared to former and never users, but not occasional users.

Conclusions: The present study examined associations between self-reported cannabis use history and neuropsychiatric symptoms among former American football players. Overall, results suggest that more frequent cannabis use is associated with higher levels of NBD symptoms. It is possible that former players who report more severe symptoms attempt to use cannabis to manage these problems. However, it is also possible that more frequent cannabis use may worsen existing NBD symptoms related to RHI exposure. There may be additional factors that contribute to this relationship, such as the age of first use, which has been linked to long-term deficits in cognitive and psychosocial functioning, as well as the underlying cause(s) of the NBD symptoms.

526 "Brain Metabolism and Cognitive Impairment following Traumatic Brain Injury (TBI) of Domestic Violence Shelter Residents: A PET/MRI study."

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ABSTRACT

The 2022 United Nations report indicates that up to 30% of women globally have experienced sexual and/or physical violence by their partner at least once in their lives. Previous studies (Black et al., 2011) report that nearly one in four women and one in seven men in the US reported severe physical violence (being hit, kicked, choked, beaten, burned, stabbed, or shot) by their intimate partner. Twenty-five percent of these women have experienced TBI and at least sixty percent have sustained more than one TBI with loss of consciousness. Women who experience Intimate Partner Violence (IPV) do not routinely seek health services for injuries (Davis, 2014) and although injuries to their face and head are common, when medical services are provided, TBI is often overlooked or minimized (Banks, 2007; Davis, 2014). Davis (2014) states, "The impact of TBI in abused women creates a multitude of sequelae that may or may not be recognized acutely but have long-term impact on health outcomes" (p. 301). Significantly, head injuries sustained by this study population are often unreported and left untreated; subjects

have not been traditionally included in most clinical trials of putative neuroprotective or restorative drugs (e.g. Narayan et al 2002). IPV survivors often have deficits in higher brain function, common in the aftermath of brain injuries of all severities. Studies in humans with cognitive deficits, including aMCI and Alzheimer's disease, report decreased glucose utilization in brain regions which play a crucial role in memory formation. Brain glucose metabolism plays a prominent role in TBI pathology; there is a close relationship between glucose metabolism and memory deficits in TBI and other pathologies such as Alzheimer's disease, stroke and chemo brain. Glucose metabolism can be imaged with the specific tracer fluorodeoxyglucose F18 (18F] FDG). Drs. Monahan and Biegon are investigating the relationship between glucose metabolism and neuropsychological sequelae of TBI. Participants who sustained a traumatic brain injury emanating from physical battering from a domestic partner were identified and recruited directly from three domestic violence shelters in Suffolk County, New York, as well as other agencies serving domestic violence victim. Thus far, the study and neuropsychological test results of participants reveal large (IZI>1) deficits in verbal memory and attention/processing speed. Deficits in most other domains, including sustained concentration and executive functions, nonverbal analytical reasoning, nonverbal abstract problem solving, and inductive reasoning are noted. Scores on scales of depression, PTSD, and concussion outcome were also high for all women. In addition to the study results the author will discuss some of the challenges with recruiting and conducting this study.

527 Using Implementation Science to Examine Rehabilitation Practitioners' Adoption of a Novel Data Visualization Tool for the Coma Recovery Scale-Revised When Evaluating Patients with Disorders of Consciousness

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ABSTRACT

Introduction: The Coma Recovery Scale-Revised (CRS-R) is a common data element and widely used assessment for patients with disorders of consciousness (DoC). Prior work has generated a data visualization tool, called the Recovery Ruler, to display CRS-R assessment results.

Objectives: We evaluated the reach, adoption, and implementation of the Recovery Ruler across four DoC programs in the United States. We also aimed to identify facilitators and barriers to adopting and implementing the Recovery Ruler in clinical practice.

Methods: We conducted an explanatory sequential mixed methods study. We provided Recovery Ruler education to rehabilitation practitioners at four inpatient DoC programs. Eligible practitioners had at least six months of CRS-R experience. Each practitioner was invited to participate in a study consisting of twelve weekly surveys followed by three monthly surveys. Each survey assessed the reach, adoption, and implementation of the Recovery Ruler. We used the Reach Effectiveness Adoption Implementation and Maintenance (RE-AIM) Framework to examine: 1) Reach: % of eligible rehabilitation practitioners who participated in the Recovery Ruler study; 2) Adoption: % of participants who reported adopting the Recovery Ruler at least once; and 3) Implementation: % of opportunities when participants reported using the Recovery Ruler with the CRS-R. Finally, we recruited participants from each DoC program to participate in a 45-minute semi-structured interview to identify the barriers and facilitators to using the Recovery Ruler. Interviews were audio-recorded, transcribed, and de-identified. We used the Theoretical Domains Framework (TDF) to conduct a deductive framework analysis of each transcript.

Results: We reached 26 (41%) of 63 eligible rehabilitation practitioners who agreed to participate in the survey study. Twenty-four of the 26 participants adopted the Recovery Ruler at least once. When participants reported administering the CRS-R, practitioners implemented the Recovery Ruler 41% (232/564) of the time. We interviewed fourteen rehabilitation practitioners. Interviewees described being motivated to use the Recovery Ruler to improve communication with family caregivers (TDF: beliefs about consequences). We learned that implementation decreased because the practitioners preferred to use the Recovery Ruler only when the family was at the bedside. Practitioners suggested the Recovery Ruler would be beneficial to integrate into the electronic health care record. Competing demands and lack of knowledge presented barriers to implementation (TDF: environmental context and resources; knowledge).

Conclusions: Adoption of the Recovery Ruler was high across programs. However, we do not know why we did not 'reach' 59% of eligible rehabilitation practitioners for the survey study. For the adopters, the reported implementation varied across programs and over time. Identifying barriers and facilitators may support the development of a tailored implementation strategy to improve adoption and sustained implementation across DoC programs.

528 Reflections and Lessons from Conducting Mixed-Methods Research with Individuals with Traumatic Brain Injury: An Autoethnography Study

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ABSTRACT

Introduction: After a traumatic brain injury (TBI), an individual might experience varied outcomes due to the environment, their personality characteristics, and injury-related

impairments. Participating in research studies may be difficult for individuals with TBI due to a range of health-related and personal problems. For example, participants may have trouble recalling information or feel vulnerable when sharing personal experiences. It can also be challenging for researchers to navigate data collections sessions as they may have limited resources and strategies to create a person-centered environment.

Objectives: To explore researcher experiences of conducting mixed-methods research with individuals with moderate to severe TBI and to describe approaches to help improve researcher-participant relationships.

Methods: An autoethnography study was conducted, analyzing the experience of a novice researcher conducting a mixed-methods study with 16 participants with moderate to severe TBI. Data collection consisted of transcripts from participant interviews, questionnaire sessions, and reflexive notes by the researcher. Reflexive thematic analysis was used to generate themes of researcher experiences when interacting with participants during data collection.

Results: Three themes and three key strategies were identified, relating to challenges and facilitators to form a person-centered environment. First, 'creating connections' focuses on participant experiences that may have been inadvertently minimized and the need to build rapport with participants before data collection. Second, 'asking the right questions' examines the need for researchers to consider how participants will perceive questions and being aware of potentially sensitive words that are already established in standardized quantitative questionnaires. Last, 'wearing academic armor' explores how researchers can adapt and adjust to each participant to create a personalized approach, as well as being open to participant emotions that may arise when talking about their injury. Three key strategies to facilitate research-participant relationships were identified: (1) using a multimethod design to enhance and supplement the research investigation, (2) collaborating with stakeholders as well as participants prior to the study to increase the suitability of study protocol, and (3) employing a strong active listening approach to help navigate the conversation and discern participant verbal and non-verbal cues.

Conclusions: This study examines researcher experiences when collecting data with individuals with TBI and provides generalizability to other disability populations. These experiences and strategies can serve as a tool for researchers to design their study using these approaches and improve the data collection process for participants with TBI.

529 A Network Approach to Post-concussion-like Symptoms: Comparing Central Symptoms Between Young Adults With and Without a Remote Concussion History

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ABSTRACT

Objective: Post-concussion symptoms are nonspecific and commonly endorsed by individuals with unrelated health conditions, even without a concussion history. This study examined differences in the network structure of post-concussion symptoms, and mechanisms for symptom maintenance, between young adults with and without a remote concussion history. Observable differences in network indices may elucidate which symptoms and symptom connections are specific to concussion, compared to non-specific symptoms commonly endorsed by individuals with no concussion history.

Methods: Undergraduates (N=351; 15.4% male; 76.8% White; 2.9% Hispanic; 25.2% with a prior concussion [26.6% <1 year since injury]) from a Southeastern University reported post-concussion symptoms thrice daily for 30 days using an ecological momentary assessment design. Between-person network analysis was applied to daily responses on the 22-item Post-Concussion Symptom Scale. The psychometric networks, averaged across all days and participants, depict symptom centrality through average bridge strength (BS) and the strongest connections between central symptoms and other sequelae through average edge weights (EW). Two between-person networks were compared between undergraduates with and without a remote concussion history.

Results: Overall, in the concussion group Feeling more Emotional, Difficulty Remembering, and Sadness were the most central symptoms (BS range: 4.85-5.86). The strongest edge weights connecting central symptoms were Feeling more Emotional-Fatigue (EW=.65), Difficulty Remembering-Fatigue (EW=-.64), and Sadness-Feeling more Emotional (EW=.62). In the control group, central symptoms were Sleeping More than Usual, Difficulty Remembering, and Sensitivity to Noise (BS range: 3.14-3.54). The strongest edge weights connecting these symptoms were Sleeping More than Usual-Difficulty Remembering (EW=-.35), Difficulty Remembering-Difficulty Concentrating (EW=.56), and Sensitivity to Noise-Sensitivity to Light (EW=.75).

Conclusions: In undergraduates with a remote concussion history, affective and cognitive symptoms were prominent. After a month of daily tracking, these symptoms were shown to predominantly activate and amplify sleep-related problems like Fatigue. Future research should explore whether variability in sleep quantity and quality relates to symptoms in concussion presentations, particularly examining the effect of poor rest on academic performance. In those without a prior concussion central symptoms were mixed, highlighting the nonspecific nature of concussion-like symptoms and their relation to general, global distress. In the control group, symptom activation patterns were mixed between hypersomnia, cognitive problems, and sensory sensitivity. Heterogeneous patterns of central symptoms and symptom activations may reflect the various academic, social, vocational, and interpersonal stressors that are common in undergraduate populations. Interestingly, Difficulty Remembering was the only shared item between the groups for symptom centrality, meaning undergraduates endorsing post-concussion symptoms, regardless of etiology, report poorer memory that is salient to their presentation. Further research is needed to examine the centrality of objective cognitive deficits, separating them from

the common self-reported difficulties of undergraduates navigating college coursework.

530 Acceptance and Commitment Therapy to treat psychological distress after a moderate to severe traumatic brain injury delivered by video conferencing or face to face: A three-armed randomized controlled trial

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ABSTRACT

Psychological distress is often elevated after an individual experiences a moderate to severe traumatic brain injury (TBI) and they undertake a long process of adjusting to their new reality. Acceptance and commitment therapy (ACT) has demonstrated initial promise to alleviate this distress but processes of therapy, such as development of psychological flexibility, are less clearly established.

Individuals (n=46) with a TBI (PTA=> 7 days) were recruited from community brain injury services across NSW, Australia. They were randomized on a 2:2:3 ratio, to either ACT (delivered by video consulting [VC]: Face to face [F2F]) or a constrained treatment as usual (cTAU) control, with those in the ACT group receiving 9 sessions of ACT. Primary outcome measures were measured at pre, post and three-month follow-up, and included psychological distress (Depression Anxiety Stress Scale-21: DASS-21), process measures of experiential avoidance (Acceptance and Action Questionnaire: AAQ-ABI) and engaged living (Engaged Living Scale: ELS) with secondary outcome measures assessing quality of and satisfaction with life (Quality of life after Brain Injury and Satisfaction with Live Scale). Statistical methods implemented intention to treat analysis using piece wise multilevel modelling. Non inferiority analyses were non-significant at all three time points indicating delivery of treatment by VC was as good as delivery by F2F on all primary and secondary outcome variables. The ACT groups were combined and compared to the cTAU control group at pre and post intervention with those in the ACT group reporting significant reductions in psychological distress ($t(40.9) = -2.78$ $p= 0.008$) and experiential avoidance ($t(68.8) = -3.32$ $p= 0.001$) and significant improvements in their engaged living ($t(76.6) = 3.61$ $p= 0.001$) and quality of and satisfaction with life ($t(58.6) = 3.64$ $p= 0.001$) when compared to the cTAU. Treatment gains were maintained at three months post treatment.

This research provides further support for ACT being an effective treatment for psychological distress after a moderate to severe TBI with significant reductions in distress and improvements in quality of life. In addition, the results indicate that remote delivery via VC is a good as when the intervention is delivered F2F. This has positive implications for more versatile psychology service delivery models for rural and remote communities and for those in urban areas who may experience access difficulties in physically attending treatment clinics.

531 Pediatric Moderate and Severe Traumatic Brain Injury: A Systematic Review of Clinical Practice Guideline Recommendations

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ABSTRACT

Traumatic brain injury (TBI) is the leading cause of death and disability in children. Many clinical practice guidelines (CPGs) have addressed pediatric TBI in the last decade but significant variability in the use of these guidelines persists. Here, we systematically review CPGs recommendations for pediatric moderateto-severe TBI, evaluate the quality of CPGs, synthesize the quality of evidence and strength of included recommendations, and identify knowledge gaps. A systematic search was conducted in MEDLINE, Embase, Cochrane CENTRAL, Web of Science, and Web sites of organizations publishing recommendations on pediatric injury care. We included CPGs developed in high-income countries from January 2012 to May 2023, with at least one recommendation targeting pediatric (less than 19 years old) moderate-to severe TBI populations. The quality of included clinical practice guidelines was assessed using the AGREE II tool. We synthesized evidence on recommendations using a matrix based on the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework. We identified 15 CPGs of which 9 were rated moderate to high quality using AGREE II. We identified 90 recommendations, of which 40 (45%) were evidence based. Eleven of these were based on moderate to high quality evidence and were graded as moderate or strong by at least one guideline. These included transfer, imaging, intracranial pressure control, and discharge advice. We identified gaps in evidence-based recommendations for red blood cell transfusion, plasma and platelet transfusion, thromboprophylaxis, surgical antimicrobial prophylaxis, early diagnosis of hypopituitarism, and mental health management. Many up-to-date CPGs are available, but there is a paucity of evidence to support recommendations, highlighting the urgent need for robust clinical research in this vulnerable population. Our results may be used by clinicians to identify

recommendations based on the highest level of evidence, by healthcare administrators to inform guideline implementation in clinical settings, by researchers to identify areas where robust evidence is needed, and by guideline writing groups to inform the updating of existing guidelines or the development of new ones.

534 Implementation Considerations for First Clinical Practice Guideline for Intimacy and Sexuality Following Moderate to Severe Traumatic Brain Injury (INTIMASY-TBI)

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ABSTRACT

Introduction: Moderate to severe traumatic brain injury (MS-TBI) can negatively impact intimacy, relationships, and sexual function through changes in physical, endocrine, cognitive, behavioural, and emotional function. Without intervention, diminished sexual functioning in individuals with MS-TBI will persist over time. Although most healthcare professionals agree that intimacy, relationships, and sexuality are significant concerns that should be addressed in rehabilitation, these concerns have not been typically discussed during rehabilitation and discharge planning compared to other care domains following an MS-TBI. To address this gap, an expert panel of North American clinicians and researchers convened to develop evidence-informed recommendations to discuss the physical, psychosocial, behavioural and emotional aspects of sexuality and intimacy post-TBI with MS-TBI patients.

Methods: A systematic search was conducted to identify relevant evidence published from 2010 to 2020. The INTIMASY-TBI Expert Panel developed recommendations for integrating discussions related to intimacy and sexuality within MS-TBI rehabilitation and community-based programs. For each recommendation, the evidence was evaluated by the Expert Panel in terms of study design and quality to determine the level of evidence grading. A decision-making algorithm was also designed to guide clinicians in discussing intimacy and sexuality early post-injury (<6 months) and in the community. Clinicians were interviewed to discuss barriers and facilitators to implementation of this guideline.

Results: A total of twelve recommendations were developed that address the following topic areas: 1) interprofessional team training providing all clinicians with a basic understanding of how MS-TBI can affect sexuality and intimacy, 2) providing the patient and partner early education on the effects of MS-TBI on intimacy, relationships, and sexuality, 3) creating individualized interventions about intimacy and sexuality that considers the gender, age, sex, sexual orientation and gender identity of the individual with MS-TBI, 4) education, assessment and management of the causes of sexual dysfunction, and 5) providing individuals with MS-TBI and their partners with written materials regarding sexuality, relationships and intimacy, and relationship coaching during inpatient and outpatient rehabilitation. Two recommendations were supported by Level A evidence, 1 was supported by Level B evidence, and 9 were supported by Level C (consensus of the INTIMASY-TBI Expert Panel) evidence. A decision algorithm was developed to assist clinicians in navigating through the recommendations. Preliminary results of interviews suggest clinicians would value more training in intimacy after TBI and time is a barrier. Full results to be discussed.

Conclusion: The INTIMASY-TBI Guideline is one of the first clinical practice guidelines to assist clinicians in promoting the maintenance of healthy relationships, intimacy, and sexuality for persons with MS-TBI and their partners. There are barriers to implementation and therefore the guideline offers implementation tools to assist clinicians in discussing the physical, psychosocial, behavioural, and emotional aspects of sexuality and intimacy with people with MS-TBI.

536 Teaching Educators about Acquired Brain Injury: Individual Differences in the Impact of an Online Professional Development Module on Knowledge and Confidence

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ABSTRACT

Background: Acquired Brain Injury (ABI) is a leading cause of death and disability in children and youth. ABIs can impact cognition, physical abilities, emotions, and behaviours. Despite the broad consequences of these injuries, educators are unaware of ABIs and how they may impact youth at school. To fill this gap, we created an online professional development module, TeachABI, about ABI and supporting students with ABI in Ontario schools. We previously reported the knowledge and self-efficacy outcomes of TeachABI in our full sample of participants. This abstract presents exploratory subgroup analyses examining how participants' prior knowledge and self-efficacy influence module outcomes.

Methods: Ontario educators (N = 50) completed surveys (ABI knowledge, knowledge application case study, self-efficacy) at three time points: pre-module (T1), post-module (T2), and 60-days post-module (T3). Some participants (n = 29) completed a semi-structured interview about their

experience with TeachABI at T2, but this data is not presented herein.

Analysis: To explore how baseline scores related to change from T1-T2 and T1-T3, we performed linear regressions with baseline score as the predictor. To examine whether participants with high-baseline scores benefitted from the module, we performed Friedman's test with the subgroup who had baseline scores +1 SD above the mean (n = 7-9). We used a nonparametric MANOVA to compare participants with low-baseline scores (-1 SD below the mean, n = 6-9) to those with high-baseline scores across time.

Results: Linear regressions show that as baseline scores increase, T1-T2 change scores decrease for knowledge ($R2 = .69$, $F(1, 43) = 94.56$, $p < .001$) and self-efficacy ($R2 = .81$, $F(1, 45) = 188.7$, $p < .001$). The same was found for T1-T3 scores (knowledge: $R2 = .59$, $F(1, 43) = 62.45$, $p < .001$; self-efficacy: $R2 = .57$, $F(1, 45) = 60.9$, $p < .001$). Following a significant Friedman's test, Bonferroni-corrected Wilcoxon signed-rank tests ($\alpha = .016$) showed that high-baseline participants' scores were not significantly different between T1-T2 ($Z = -2.11$, $p = .035$) or T1-T3 ($Z = -1.90$, $p = .058$). Friedman's test of self-efficacy scores indicated no significant differences across time ($2(2) = 4.90$, $p = .086$). MANOVA results suggested that low-baseline participants had the same final scores as the high-baseline group for both knowledge and self-efficacy.

Implications: Previous whole-sample analyses suggest that TeachABI increases educators' ABI knowledge and self-efficacy for supporting a student with ABI. The subgroup analyses provide nuance to these findings; Some educators receive little benefit from TeachABI, while others benefit enough to meet their peers' level after TeachABI. These results will be considered when analyzing interview data, to see whether high-baseline participants report qualitative benefits from the module, and in future studies examining the effectiveness of TeachABI in a larger sample.

539 Real-world Implementation of a Parenting Program for Kids with Brain Injury and Other Conditions: 18-month Progress Update

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ABSTRACT

Background: Families of children with conditions affecting brain development experience child behavioural challenges, yet support remains limited. I-InTERACT-North is a virtual, stepped-care parenting intervention that supports family well-being and targets behavioural concerns for children with brain injuries or conditions affecting neurological development. This study has two main objectives: (1) describe the clinical implementation of I-InTERACT-North at a large children's hospital in Canada, guided by The Implementation Roadmap (TIR); and (2) evaluate the program's preliminary acceptability and efficacy in improving child behaviour and parental mental health.

Methods: Guided by TIR, we conducted implementation readiness surveys across 3 clinics at The Hospital for Sick Children, followed by implementation meetings every 3 months. We measured program demand through referral and consent rates. Therapist fidelity checklists were also completed. Preliminary program acceptability and efficacy was measured via program satisfaction, parent-reported child behaviour problems (Eyberg Child Behavior Inventory [ECBI]) and parental mental health (Depression Anxiety Stress Scales [DASS]). Participants included families of children aged 3-9 years who completed I-InTERACT-North (N=51; Mage=6.2 years, SD=1.8; 70.6% male). Children referred to the program had either a medical condition affecting neurological development (52.9%; e.g., congenital heart disease, epilepsy, perinatal stroke), a neurodevelopmental condition (37.3%; e.g., attention-deficit/ hyperactivity disorder, autism spectrum disorder), or both (9.8%).

Results: Readiness surveys indicated a strong alignment of I-InTERACT-North with clinic needs and feasibility across the Neonatal Neurodevelopmental Follow-Up, Epilepsy, and Psychiatry clinics. There was a strong uptake of I-InTERACT-North, with 231 referrals received between February 2022 and September 2024. Of those, 138 families consented to participate (59.7%), 51 completed treatment (36.9%), and 41 are either waitlisted or currently completing treatment (29.7%). The remaining families either declined (14.7%), were ineligible (6.9%), withdrew (3.9%), or could not be reached (14.7%). Therapy session fidelity was high, with 89% adherence to session core objectives. Participant satisfaction with program focus and delivery was also high. Significant reductions were observed in child behaviour problems from pre- (problems: M=63.09, SD=8.36; intensity: M=62.96, SD=6.31) to post- (problems: M=56.41, SD=10.05, t[30]=4.4, p<.001; intensity: M=58.1, SD=6.27, t[30]=4.3, p<.001) intervention. There was also a significant pre- (M=14.41, SD=9.06) to post- (M=11.37, SD=7.55) intervention decrease in parental stress (t[47]=3.1, p<.001). Reductions in parental depression and anxiety were observed but were non-significant.

Conclusions: I-InTERACT-North demonstrates potential for successful program implementation across various clinics within a paediatric hospital setting, meeting clinic-specific needs and feasibility. Likewise, the program offers valuable mental health support to families of children with diverse neurological conditions. TIR provides a systematic approach to effective program implementation, including innovative co-design, ongoing evaluation, and iterative revisions to ensure sustainability. Insights gleaned from this implementation will inform ongoing initiatives to optimize and expand the program's clinical reach across other paediatric centres in Canada, benefitting more families in need.

540 Altered Relationship Between Functional Connectivity and Emotional Distress Following Acute Concussion.

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ABSTRACT

Purposes and Hypothesis: Concussions can cause significant emotional distress in the initial phase of injury, including elevated symptoms of anxiety and depression. However, it is unclear to what extent these symptoms reflect dysfunction in neural circuitry caused by concussive injury and to what extent they reflect normal psychological response to the injury event. This study used blood-oxygen-level-dependent functional magnetic resonance imaging (BOLD fMRI) to investigate whether concussion was associated with an abnormal relationship between distress symptoms and brain function.

Methods: A total of 182 varsity athletes, 55 acutely concussed and 127 non-concussed from a single university, underwent eye-closed resting-state functional MRI scans and completed the Hospital Anxiety and Depression Scale (HADS). HADS depression and anxiety sub-scores were compared between the groups. For brain regions previously implicated in depression and anxiety, multiple linear regression assessed the effects of concussion status, HADS score and their interaction on seed-based functional connectivity.

Results: The concussed group demonstrated significantly elevated symptoms of depression (mean difference ± SE: 1.00 ± 0.186; $p < .001$, CI = 95%) but not anxiety (mean difference ± SE: 0.353 ± 0.265; $p = .184$, CI = 95%)compared to non-concussed athletes. Examining imaging data, however, there was an interaction effect of concussion and HADS anxiety score ($t(176) = 5.528$; mean difference ± SE: 0.013 ± 0.002); higher anxiety for concussed athletes was associated with a more extreme increase in amygdala connectivity compared to controls. Conversely, depression scores were associated with reduced sub-genual anterior cingulate cortex (sgACC) severity, ($t(176) = -5.281$; mean difference ± SE: -0.015 ± 0.003) but this relationship was not affected by concussion status. ($t(176) = -4.206$; mean difference ± SE: -0.053 ± 0.013).

Conclusions: Our findings provide new insights into network-level changes that occur acutely following concussion. More specifically, symptoms of post-concussion anxiety (but not depression) may have a distinct representation in the brain compared to uninjured controls, suggesting this component of the emotional response may be at least partially caused by the injury. These results provide new insights into the neural substrates of post-concussion symptoms and, translationally, may indicate a novel target for future post-concussion interventions and rehabilitation.

541 Neurocognitive Sequelae of Long COVID: A Systematic Review

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ABSTRACT

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) acquired pandemic status in early 2020 (WHO, 2024). Symptoms include fever, cough, sore throat, congestion, shortness of breath, fatigue, aches, headache, anosmia, ageusia, and nausea (CDC, 2022). Neurological manifestations such as confusion, stroke, and seizure as well as psychological symptoms are documented for persons with more severe cases of SARS-CoV-2 (García-Sánchez et al., 2022; Hosp et al., 2021) and/or geriatric populations. Cognitive difficulties associated with SARS-CoV-2 infection are theorized to involve neuroinflammation, hypoxia, dysregulation of the hypothalamic-pituitary-adrenal axis, neurological disruption, and organ damage (e.g., Iadecola et al., 2020; Jaywant et al., 2021). Cortical changes following SARS-CoV-2 infection may occur and cognitive changes may persist beyond the duration of recovery from other symptoms.

Objective: This systematic review explored the emerging literature of neurocognitive symptoms and the duration of symptoms for persons with long-COVID (i.e., > 3 months of symptoms) in adults younger than 65 years.

Methods: The systematic review followed Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) protocol. PsychARTICLES, PsycINFO, Healthsource, and Medline databases were searched with term combinations focusing on cognition (i.e., working memory, executive functioning, etc.) and long-COVID (post-infection, post-COVID, COVID-19, coronavirus, SARS-CoV -2) and so forth. Inclusion criteria: (1) published in a peer-reviewed journal, (2) in English, (3) a North American study (due to potential virus variants), (4) between March 11, 2020, and June 3, 2023, (5) focused on cognitive functioning of persons diagnosed COVID-19 positive at least 3 to 4 weeks prior to enrollment, (6) primarily adults between ages 18-65 years, and, (7) quantitative. Studies underwent quality assessment via two independent reviewers.

Results: A total of 3827 articles were identified (632 duplicates) with 3152 screened via title and abstract whereby 549 studies met inclusion criteria (523 were excluded due to reasons of irrelevant outcomes, published outside of North America, study design, no data provided, not published in English, paediatric/geriatric population, did not include long COVID participants, and/or was meta-analyses/review). A total 24 studies published in North America were included in this systematic review (14 cohort, 3 longitudinal, 4 cross-sectional, 2 repeated measures, and 1 case study) with a total of 307,051 participants (Mage 50.7 years). Average time since SARS-CoV-2 infection was 9.5 months with COVID-19 diagnosis and/or report predominantly confirmed through PCR, antigen test, and/or medical professional. Overall, 8-50% of participants experienced significant neurocognitive changes (via both objective [i.e., WAIS-IV; MoCA] neurocognitive and subjective measures) most commonly poorer memory, difficulty sustaining attention and concentration, brain fog

and reduced executive functioning skills with many difficulties persisting months postinfection.

Conclusions: Little is known about the persistence of long COVID difficulties, though the current systematic review revealed that neurocognitive symptoms may continue beyond 18 months which has implications for cognitive neurorehabilitation.

542 Integrated Assistive Technology Can Increase Independent Functioning Through Compensation for Executive Impairment After Severe Acquired Brain Impairment: Four Single-Case Experimental Trials

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ABSTRACT

Integrated assistive technology (AT) has significant potential to effectively compensate for impairments in executive function commonly observed after severe acquired brain injury (sABI) such as prospective memory, initiation, planning and sequencing everyday activities. Single-case experimental designs (SCEDs) are an effective means to evaluate tailored AT solutions. The great majority of SCEDs published within the field to date are however of low methodological quality, and there is a need for more rigorous studies. We aimed to evaluate the effectiveness of mainstream technologies (e.g., home hubs, sensors and smart lighting) in tailoring AT solutions to achieving participation goals to enhance client independence in everyday activities after sABI. A series of withdrawal A1-B1-A2-B2 designs was used. Each SCED was planned applying a published a priori study protocol and using the Risk of Bias in N-of-1 Trials to maximise internal and external validity. Inclusion criteria included aged over 18 years, impairments in executive function after sABI, and living in the community with substantial support needs. Seven clients consented to undertake the intervention, with four participants completing the trials. Person-centred goal-directed planning with participants identified diverse primary targets to increase independence in (i) taking medication, AA; (ii) reading an audiobook, BB; (iii) scrapbooking a photo collection, CC; and (iv) preparing breakfast, DD. In each case, a range of potential technologies was explored in consultation with the participants and their family supports, before settling upon the preferred configuration. The list of technologies finally employed included a home-hub, smart speakers, motion and/or contact sensors, smart lighting, and a sleep analyser pressure pad/smart watch. Specific AT configurations varied in each trial. In three of the four trials, results of the weighted average Tau-U across the phases was significant (AA, Tau-U=1.0, p=0.000, z=4.73; BB, Tau-U= 0.55, p=0.0382, z=2.07; CC, Tau-U= 0.62, p=0.0188, z=2.36), indicating increased independence in the targeted goal. In conclusion, this trial has provided evidence that integrated AT solutions linked to activity goals require targeted planning and pilot testing but are feasible to implement in community environments with people with sABI.

543 Male and Female Differences in Concussion Recovery: The Influence of Time to Clinic Presentation

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ABSTRACT

Background: Recovery time following concussion has previously been demonstrated to vary by sex. Time to clinic presentation may influence timing of treatment initiation and thereby affect concussion recovery outcomes. Therefore, the aim of this study was to investigate the relationship between sex, time to clinic presentation, and recovery time. We hypothesize that time to clinic presentation may modify the relationship between sex and recovery time.

Methods: We conducted a secondary analysis of existing clinical data from a cohort of patients treated in a single specialty concussion clinic at a tertiary care center between 2017 and 2019. Patients ages 6-24 years diagnosed with concussion were eligible for inclusion if their initial clinic visit occurred within 3 weeks from the date of injury. Unadjusted Kaplan Meier survival curves were used to display time to clinic presentation and time to recovery by sex, censoring at date of last clinic visit if lost to follow-up. To test the association between time to recovery and sex, we conducted three separate cox proportional hazard regressions to estimate hazard ratios (HR) with 1) sex as the primary exposure, 2) sex while adjusting for age, concussion history, symptom severity, and distance from the clinic, 3) sex while adjusting for days to clinic presentation, age, concussion history, symptom severity, and distance from the clinic. We determined models significant if 95% confidence intervals (CI) excluded 1.

Results: A total of 486 patients (15.5 ± 3.1 years; 285 males, 58.6%) presenting to the clinic within 20 days. Unadjusted cox regression revealed females had slower recovery (HR: 0.70, 95%CI: 0.56,0.86) than males. When adjusting for age, concussion history, symptom severity, and clinic distance females had slower recovery than males (aHR 0.80, 95% CI: 0.64,1.00). When adding days to first clinic visit as a covariate sex differences were null (aHR: 0.91, 95% CI: 0.73, 1.13).

Conclusions: Males and females treated at a specialty concussion clinic displayed overall differences in recovery

outcomes, aligning with prior research suggesting females exhibit slower recovery outcomes. However, when adjusting for notable covariates, specifically time to clinic presentation, there were no significant sex differences. These findings suggest a potential sex-based disparity in post-concussion healthcare activation and highlight opportunities to improve concussion outcomes.

544 Context Classification of 15,539 Mild Traumatic Brain Injury Events Reported by Deployed Service Members and Veterans using Large Language Models.

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ABSTRACT

The environment and context of mild traumatic brain injury (mTBI) are critical factors that can determine timely treatment, risk of secondary injury, and long-term health outcomes. However, classifying the context and circumstances of an mTBI is a complex and labor-intensive task, typically requiring comprehensive documentation and description of events, as well as expert interpretation and an agreed set of standard context classifications. Here, we report results from the Long-term Impact of Military-relevant Brain Injury Consortium (LIMBIC) Prospective Longitudinal Study (PLS) that assessed the performance of large language models (LLMs) tasked to classify the context of historical mTBIs from text descriptions of events reported by deployed Service Members and Veterans (SM/V). Text descriptions of 15,539 events were summarized from structured interviews of 2,750 SM/V, with a median age 24 years at time of injury. An expert panel was convened that identified four context categories that encompassed all possible environments in which injury had accrued: 1) Civilian, 2) Military duty outside of deployment, 3) Deployment outside of combat action, and 4) Combat action. Seven expert raters provided gold standard labels for 750 event descriptions, achieving 98.3% agreement among raters. A range of pretrained and fine-tuned LLMs of varying architecture and parameter size were tasked to classify deidentified text descriptions, training on 250 rater-labeled descriptions with performance assessed on 500 held-out multinomial labeled events. Overall, an optimal fine-tuned model reached 4.3% train loss after 3 epochs. Models were then retrained on a subset of discordant edge case examples. The final model achieved 3.1% error under cross-validation. The most frequent contexts reported were Combat action (40.0%), followed by Civilian (29.4%), Military duty outside of deployment (20.4%) and Deployment outside of combat action (10.2%), indicating high rates of mTBI during combat action environments among deployed SM/V. In post-hoc analysis, raters identified that the remaining errors tended to be ambiguous cases that lacked clear context. Categorical context of injury was also found to be significantly associated ($p<0.05$) with several tested mTBI related measures in ways that suggest further research into etiological considerations may offer personalized approaches and improved quality of life for SM/V with history of mTBI.

545 Exploring Public Perceptions about TBI: A Scoping Review

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ABSTRACT

Introduction: Individuals with a traumatic brain injury (TBI) may experience a wide range of changes post-injury. Individuals with TBI may have cognitive and physical challenges such as attention and mobility problems; they may also encounter social difficulties such as stigma and discrimination, which may stem from a lack of public education and awareness. However, the current public perceptions on TBI are not known.

Objective: To identify current evidence on public perceptions on TBI.

Methods: A scoping review was conducted using the following databases: MEDLINE, CINAHL, Embase, and PsycINFO. Peer-reviewed journal articles were reviewed from inception to April 2024. Articles were included if they: 1) presented data on perceptions about TBI, 2) included adult participants who were members of the lay public, and 3) were published in the English language. Articles were excluded if they were reviews or dissertations, assessed perceptions about pediatric TBI, or recruited participants who had extensive knowledge or training about TBI.

Results: 3872 articles were obtained from the databases and 112 full-text articles were reviewed. Of those, 18 were included in our study, reporting on various antecedents and beliefs about TBI. Antecedents of age, sex, and education reported inconsistent patterns on the effect on public perception. However, individuals who had more personal experiences with brain injury (i.e., family/friends with brain injury) had fewer misconceptions about TBI. Most individuals from the public had accurate knowledge about prevention, knowledge, and TBI outcomes. However, topics of memory loss, coma and unconsciousness, recovery and rehabilitation after TBI reported higher misconceptions. Additionally, findings indicated that the public were more likely to misattribute behaviors of a TBI to another cause if the injury was not visible and perceive individuals with TBI as lower in competency.

Conclusions: Findings from our study identified existing perceptions of TBI. A lack of public understanding about this injury can exacerbate stigma, cause barriers to receiving

support, and increase physical and mental health difficulties for individuals with TBI. Our findings can help guide future research to implement practices to reshape public perception about TBI and facilitate increased recognition and acceptance about life after TBI.

546 high Intensity Gait Training in Children with Brain Injury: A Case Series

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ABSTRACT

Background: Research has attempted, without success, to determine the most effective and efficient interventions to address mobility deficits and improve overall quality of life in children with brain injury. This is quite different from the adult neurological patient population, in which a consensus has been reached that high intensity gait training (HIT) is the preferred treatment intervention to yield the greatest mobility gains. It is hypothesized that HIT aligns with a child's natural pattern of movement and play, with periods of high intensity activity throughout the day. This report will describe the feasibility and outcomes of a high intensity gait training protocol completed with five pediatric patients diagnosed with pediatric brain injury.

Case Series: Five pediatric patients, all males ages 6-17, were admitted to inpatient rehabilitation following a brain injury resulting in impaired functional mobility. All five children participated in HIT for one hour, 4-5 days per week, for an average of 11 sessions. Interventions included treadmill ambulation, overground ambulation, and stair climbing, and targeted a heart rate (HR) range of 75-85% age-predicted HR maximum. Outcome measures were performed at admission, weekly, and at discharge. All 5 children also participated in occupational therapy, therapeutic recreation, and speech therapy (as needed).

Outcomes: All children participated in HIT for one hour per day, with an average of 35 minutes of active time per treatment session, with an average of 22 minutes in the target HR zone. All children demonstrated improvements in the Pediatric Balance Scale (PBS) and 10 Meter Walk Test (10 MWT) from admission to discharge. The mean improvement in the PBS was 43 points (admission scores ranging 4-55, discharge scores ranging 49-56), 4 children met the MCD score, and all children scored as low risk for falls at discharge. The mean improvement in the 10 MWT was 0.63 m/s for self-selected speed (admission speed ranging 0-0.6 m/s, discharge scores ranging 0.53-1.01 m/s), and all 5 children met the MCD score. All children participated in HIT without adverse events.

Discussion: This case series demonstrated that HIT is an effective and feasible treatment to be implemented in pediatric inpatient physical therapy rehabilitation. The structure of HIT sessions mirror a child's typical play integrating short, high intensity intervals with HR reaching up to 90% HR max. This enhanced the therapists' overall goal of utilizing mass repetition, variable tasks, trial/error, and error-based learning strategies to improve outcomes. Four out of five children that participated in this intervention discharged from inpatient rehabilitation at an independent level, an outcome that superseded the treating clinicians' expectations. This shows a promising outlook for the future for high intensity gait training and an ever-growing increasing population of children that endure a brain injury throughout childhood and adolescence.

547 Prognostic Value of EEG Criticality Features for Assessing Recovery in Severely Brain-Injured Pediatric Patients Under Sedation

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ABSTRACT

Introduction: Electroencephalogram (EEG) features have been widely used to assess depth of anesthesia (DOA) and levels of consciousness in adults, as well as in pediatric populations. EEG features, such as permutation entropy, Lempel-Ziv complexity, Higuchi fractal dimension, Hurst exponent measured by detrended fluctuation analysis, and spectral properties have been used to assess levels of consciousness in severely brain-injured adults. However, it remains unclear whether these EEG features, which are age-dependent, can reliably track DOA and levels of consciousness in brain-injured pediatric patients. This study hypothesized that features of EEG, collected in the intensive care unit and observed during sedation would predict outcomes in severely brain-injured children.

Methods: EEG data were collected at the bedside from (n = 31) severely brain-injured children, ages 5 and older, in the pediatric intensive care units at McMaster Children's Hospital and Alberta Children's Hospital. All patients received anesthetic exposure to Propofol, Midazolam, or Dexmedetomidine. Outcome was measured using the Glasgow Outcome Scale – Extended (GOS-E) at 3 months post-injury, with a score of ≥4 indicating recovery and <4 indicating non-recovery. EEG preprocessing was performed using MNE Python, including filtering (0.5-45 hz), re-referencing to mastoids, ICA for artifact removal from EOG and ECG, segmentation of 10-second epochs, and autorejection of bad epochs. Neurokit and FOOOF were used to extract 23 EEG features. Mann-Whitney U tests assessed group differences in features between recovered and non-recovered patients. A logistic regression model was trained with 23 features, age, and etiology, using

stratified 5-fold cross-validation. RESULTS: The analysis included 116 files for the recovered group (n=21) and 58 files for the non-recovered group (n=10). Of the 23 EEG features, 20 showed statistically significant differences between the recovered and non-recovered groups. The logistic regression model achieved an F1-score of 80%, with precision and recall of 80% and 95% for the recovered group, and 83% and 52% for the non-recovered group. The area under the curve (AUC) for the model was 0.88, demonstrating strong performance in predicting patient outcomes.

Conclusions: This study demonstrates that EEG features collected during sedation have significant prognostic value in predicting outcomes for severely brain-injured children. Machine learning models utilizing EEG features were able to predict outcomes with an accuracy of 80%, which supports the use of temporal pattern-based EEG features for outcome assessment in pediatric neurocritical care settings.

548 Facilitators and Obstacles to Residential Stability After TBI

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ABSTRACT

Introduction: Traumatic brain injury (TBI) is a common neurological condition worldwide, leading to disabilities that are often permanent and require individualized care. These disabilities put individuals at high risk of precarious housing situations. However, little is know about the residential status of individuals living with a TBI and about the facilitators and obstacles to their housing stability.

Goal: The aim of this study is to conduct a scoping review to explore the housing situations of the TCC population, as well as the facilitators and barriers to their residential stability.

Methods: A systematic scoping review was performed. With the help of a specialized librarian, we searched three different scientific databases. Articles were screened, selected and extracted individually by the researchers. The emerging data were classified according to the Modèle du développement humain - Handicap production process theoritical model.

Results: 21 articles were included in the synthesis. The results show that around 85% of people who have had a TBI live at home with one or more people. Facilitators and barriers to residential stability were classified into the three broad categories of the MDH-PPH model. Environmental factors, particularly the design of the physical micro environment, followed by human support, emerged as the most commonly reported factors influencing residential stability. Personal factors are also of secondary importance. Lifestyle habits have been little documented in the literature as determinants of residential stability.

Discussion: The results are comparable to those of others individuals living with neurodivergences and highlight the importance of environment to overcome handicap situation in housing. However, other factors such as life habits have been little studied and can be promising candidate for further studies about residential stability of individuals with TÉBI.

550 Post-traumatic Amnesia and Episodic Memory Processes

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ABSTRACT

Episodic memory is one of the most frequently impaired cognitive functions in patients assessed in neuropsychology. Among the causes, traumatic brain injury (TBI) is one of the many pathologies which can impair episodic memory. More specifically, moderate to severe TBI can induce long-term as well as acute memory impairments, the latter being known as post-traumatic amnesia (PTA). This transient state of amnesia is mainly defined as the inability to form new memories (i.e. anterograde amnesia). This common assumption that the patient is incapable of learning delays their entry into rehabilitation, which can be associated with poorer long-term outcomes. However, little is known about the real capacities of the patients to learn new memories, nor which episodic memory processes (encoding, consolidation, retrieval) are specifically impaired during this transient state. Thus, this study aimed to evaluate which processes of visual episodic memory are altered during PTA. Participants recruited in a hospital setting after sustaining a moderate to severe TBI completed a brief battery of tests assessing cognitive functioning as well as visual memory (EXACT). Half of them were in PTA and the other half had emerged. Preliminary results indicate a more significant impairment of the retrieval process for PTA patients as compared with patients who had emerged. No significant differences were found for the encoding and consolidation processes. Acquiring knowledge about the cognitive correlates of PTA could lead to tailored interventions that could be administered earlier to patients, with the aim of improving long-term recovery prognosis. Also, advancing knowledge on PTA will enhance theoretical models of episodic memory functioning, with the goal of improving clinical practices related to the assessment and management of all patients with episodic memory impairment.

551 Peer Support for People with Traumatic Brain Injury: A Multiple-Case Study Investigation of Feasibility and Impact

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ABSTRACT

Introduction: Peer support is a patient-oriented approach, integrating the expertise of people with lived experience to provide emotional and practical support with others who share a common experience. In traumatic brain injury (TBI) rehabilitation, little is known about the feasibility of integrating peer support using a community-engaged approach. Our primary objective was to evaluate the feasibility and impact of a community-based peer support program for people with moderate to severe TBI.

Methods: This mixed-methods study used a pre-post feasibility design using the Reach Effectiveness Adoption Implementation Maintenance (REAIM) framework. Participants included were adults who experienced a TBI less than 12 months ago. To understand effectiveness, we collected data on resiliency (Connor Davidson Resilience Scale), self-efficacy (General Self-Efficacy Scale), hope (Hope Hearth Index), and quality of life (EQ5D).

Results: There were 3 participants with new experience of TBI included in our study. Most measures of feasibility were achieved. Reach was achieved as 60% of participants consented to the study compared to those who were approached. Effectiveness showed minimal difference in all outcome measures from baseline to post-intervention. Adoption was maintained with 100% adherence to the intervention and the fidelity of the intervention, with > 90% of sessions aligning with session content. Implementation showed changes in the method of intervention delivery (e.g., fully virtual intervention). Maintenance was achieved as all community team members reported continuing the intervention past the research study.

Conclusions: Findings show community-engaged peer support programs are feasible for people with TBI. While there were no changes found in the quantitative measures, qualitative results suggest that meaningful connections are made through shared experiences and current life context. Future research may examine the implementation of peer support and identify outcome measures that show improvement through peer support intervention.

552 Comparison of Multiple Omics Biomarkers for Predicting Persistent Symptoms After Concussion

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ABSTRACT

Persistent symptoms after concussion (PSaC) affect approximately 25% of youths following mild traumatic brain injury (mTBI). Assessing demographic and medical factors may aid PSaC risk prediction. However, PSaC prognosis remains difficult, and this hampers early, personalized treatment. This study tested the hypothesis that assessing individual genomics could aid PSaC prediction in youths with mTBI. A prospective cohort study of 200 youths (ages 5-22 years) with mTBI was enrolled at initial presentation to emergency departments and outpatient clinics in the U.S. between January 2021 and February 2024 (35 ± 31 hrs post-mTBI). PSaC was defined as ≥ 2 symptoms above retrospective baseline on the Post-Concussion Symptom Inventory (PCSI) 30 days after mTBI. Saliva was collected at enrollment and four omics categories were assessed: microRNA levels (mir-148b-5p, miR-145-5p, miR-30e-5p, miR-320b, miR-532-5p, let-7e-5p), DNA polymorphisms (BDNF, ANKK1, APOE4, COMT, NGB), telomere length (Kilobases), and brain-related protein levels (NSE, S100-beta). Omic measures were compared between youths with and without PSaC using Wilcoxon Rank tests or likelihood ratio tests. Prognostic utility of an omics panel was compared against the current gold standard (5P tool) using hierarchical multivariate regression. Participants had a mean age of 14.7 (±3.3) years and were 59% male (117/200). Most (127/200; 63.5%) experienced sport-related concussion. Approximately one-quarter (59/200, 29%) had PSaC. Four salivary miRNAs differed in those with PSaC. Levels of Let-7e-5p (Effect = 0.29, p = 0.001), miR-30e-5p (Effect = 0.024, p = 0.008), miR-320b (Effect = 0.26, p = 0.004) and miR-532-5p (Effect = 0.18, p = 0.047) were higher in the PSaC group. There was no difference in the rates of DNA polymorphisms (BDNF, LR = 2.17, p = 0.33; ANKK1, LR = 0.35, p = 0.83; APOE4, LR = 0.73, p = 0.69; COMT, LR = 1.75, p = 0.41; NGB, LR = 0.91, p = 0.63), telomere length (Effect = 0.012, p = 0.89), or levels of brain-related proteins (NSE, Effect = 0.30, p = 0.25; S100-beta, Effect = 0.13, p = 0.62) among youths who developed PSaC. Participants' 5P scores predicted PSaC with an area under the curve (AUC) of 0.613 (69% sensitive, 45% specific). A predictive model employing 3 miRNAs, while controlling for age and sex yielded an AUC of 0.725 (78% sensitive, 54% specific). Addition of 3 miRNAs to the 5P model yielded an AUC of 0.737 (73% sensitive, 60% specific), significantly boosting 5P performance (X2 = 15.7, p < 0.001). These results show that omics measures may add unique prognostic capacity for clinicians assessing PSaC risk, beyond standard medical and demographic factors. Specifically, measurement of microRNA levels may hold greater potential than assessment of polymorphisms, telomere length, or salivary proteins. Ongoing research seeks to validate these findings in a naïve test cohort.

553 Feasibility of A Graded Treadmill Test to Assess Exercise Intolerance in Older Adults: A Pilot Study

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ABSTRACT

Objectives: Adults aged 65 and older are at an increased risk of falls and subsequent mild traumatic brain injury (mTBI). Exercise intolerance is a common consequence of mTBI, defined as the inability or decreased ability to perform exercise at an age-appropriate level, duration, or heart rate (HR). Limited evidence is available to assess exercise intolerance in older adults who have sustained a mTBI. Previously validated exertion intolerance protocols, such as The Buffalo Concussion Treadmill Test (BCTT), have primarily assessed exercise intolerance in adolescents and those who have experienced sports-related concussions. The Older Adult Treadmill Test (OAT) serves as a modification of the BCTT to allow the assessment of exercise intolerance in the older adult population. This study aimed to assess the clinical feasibility based on the time taken to complete the OAT in a group of healthy older adults.

Methods: Nine participants were aged 66-89 years (mean age 74 ±7 years; 5 females) without a history of mTBI or pathology that would limit participation in an exercise test. Each participant completed the OAT while wearing a Polar H10 to allow for continuous monitoring of HR. Participants begin the test by ambulating on a treadmill at 80% of comfortable gait speed at 0% incline. Every 90-second stage, the treadmill incline increased by 1%. If participants reached a treadmill incline of 10%, treadmill speed increased by 0.4 mph per stage with a constant 10% incline. During each stage, recordings were taken on the Borg Rating of Perceived Exertion (RPE), VAS for symptom severity, and HR. Participants progressed through each test stage until one of the following was achieved: HR equal to 90% of age-predicted max HR; RPE of 17; the participant asked to stop the test. Participants were considered exercise intolerant if the test was terminated before reaching their target HR.

Results: Eight of 9 participants (89%) reached test termination by achieving 90% of age-predicted maximal HR. One participant stopped after reaching an RPE of 17 at 88% of his maximal HR. The mean time of completion was 14.7± 5 minutes. No adverse events occurred. There were weak negative correlations between the time to complete the OAT and age or starting HR.

Conclusions: Healthy older adults completed the OAT without adverse events or excessive fatigue. The average time for completion of the OAT was less than 15 minutes, indicating the OAT is a clinically feasible assessment. Additional research is needed to assess the safety and clinical utility of the OAT in older adults after mTBI.

554 Repetitive Transcranial Magnetic Stimulation is not Associated with Treatment-Related Changes in Functional Connectivity in The Dorsolateral Prefrontal Cortex Among Patients with Persistent Post-Concussion Symptoms: A Functional Near Infrared Spectroscopy Study

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ABSTRACT

Background: Concussion is a problem of significant magnitude and consequence. An estimated 1 in 2 people worldwide will sustain a concussion in their lifetime and up to 1/3 of these individuals will develop persistent post-concussion symptoms (PPCS). PPCS are heterogenous but commonly present as a cluster of emotional, somatic and cognitive symptoms, including headache, dizziness, fatigue, difficulty concentrating, anxiety and depression. Moreover, PPCS are debilitating and associated with decreased quality of life. Unfortunately, there are few evidence-based treatments or biomarkers for PPCS and many individuals continue to struggle for months to years post-injury. Furthermore, repetitive transcranial magnetic stimulation (rTMS), a non-invasive neuromodulation technique, is being investigated for PPCS treatment. In concert with the increased interest in neuromodulation approaches for PPCS, the use of neuroimaging techniques to identify possible biomarkers of treatment response has gained popularity in recent years. In previous studies, functional near infrared spectroscopy (fNIRS), a non-invasive form of neuroimaging that uses near infrared light to measure changes in oxygenated hemoglobin, has demonstrated reduced functional connectivity in individuals with PPCS compared to healthy controls and showed promise as a potential biomarker of PPCS.

Objectives: To determine whether rTMS is associated with treatment-related changes in prefrontal cortex functional connectivity in patients with PPCS. We hypothesized that functional connectivity collected via fNIRS would increase following rTMS treatment.

Methods: In a randomized double blind controlled clinical trial, 83 participants (61% female) were randomized to receive 20 sessions of high frequency (10Hz) rTMS treatment (n=40) or sham rTMS (n=43). The rTMS sessions were delivered to the left dorsolateral prefrontal cortex at 100-120% of resting motor threshold for 10 trains (60 pulses per train). fNIRS sessions were conducted at pre-treatment, post-treatment, 1-month and 3-month follow-up. At each fNIRS session, the n-back task (shown to be highly reliant on prefrontal cortex activity) was administered. After preprocessing, channels

displaying the maximum hemodynamic response to the task were chosen to compute functional connectivity (coherence). Coherence between the right and left dorsolateral prefrontal cortices was computed in a low frequency band (0.021-0.052Hz) related to neurogenic activity. A linear mixed effects model controlling for age and sex was used to explore the effects of timepoint and condition on coherence.

Results: No significant main effect of timepoint (β=-0.050, 95%CI[-0.109,0.008], p=.092) or condition (β=-0.022, 95%CI [-0.065,0.021], p=.323) was observed in coherence over the intervention. Additionally, there was no significant interaction between condition and timepoint.

Conclusions: Preliminary analysis of coherence between the right and left dorsolateral prefrontal cortices during the nback task was not altered after rTMS nor did it differ between treatment and sham groups. Future analyses by our group will examine other brain regions and frequency bands.

555 Rasch Calibration of the Coma Recovery Scale-Revised: Differences in Visual Function for People Non-Traumatic Brain Injury compared to Traumatic Brain Injury

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ABSTRACT

Introduction: The Coma Recovery Scale – Revised (CRS-R) is the reference standard for evaluating patients in disorders of consciousness after both traumatic and non-traumatic brain injury. Previous Rasch analyses with a sample of participants in DoC suggested that the CRS-R items, rating scale categories, and person abilities could be calibrated along an equal-interval 0-100 scale using the Rasch model. However, little research has examined whether the scale can be applied to people with disorders of consciousness stemming from a non-traumatic brain injury (nTBI). A previous study showed the Visual item of the CRS-R is more difficult for people with anoxic brain injuries compared to traumatic brain injuries (TBI); however, the study did not determine which rating scale categories within the Visual item were more challenging. In this study, we conducted a Rasch analysis of the 4576 CRS-R records from 403 participants who had disorders of consciousness from nTBI.

Methods: We applied a four-step analytical approach to generate and validate Rasch item and rating scale category calibrations for the six CRS-R items (Communication, Auditory, Visual, Motor, Oromotor/Verbal, and Arousal) on an equal-interval 0-100 scale. We compared the hierarchy of rating scale categories generated in this analysis with previous anchors generated for a sample of participants with traumatic brain injuries (TBI).

Results: All items fit the Rasch model (mean-square information-weighted fit statistics ranged from .70 – 1.14). A principal components analysis of standardized Rasch residuals provided evidence for unidimensionality (eigenvalue of the largest contrast = 1.72, accounting for 10.5% of variance in the model). The average person measure was 54.27 (SD = 12.79). Fewer than 2.5% of participants had a measure at the ceiling or floor of the instrument. Reliability indices were moderate, with an unadjusted person separation reliability of 0.78; however, the sample-independent Wright's person separation reliability was 0.94. We found that the three lowest categories on the Visual item (0: No visual function, 1: Visual startle, 2: Visual fixation) were associated with much higher average person abilities for the nTBI participants compared to the previous anchors generated with the TBI participants.

Conclusions: This study provides key insights into applying the CRS-R for individuals with nTBI. Using Rasch analysis, we transformed CRS-R scores into a 0-100 scale and compared rating hierarchies with previous results for TBI. Notably, nTBI participants showed significantly higher average person abilities when they achieved the lower Visual categories, indicating that more basic elements of visual function are more challenging after nTBI than TBI. By examining individual rating scale categories rather than items, we highlight important differences within CRS-R items. These findings suggest that clinicians should consider item-specific challenges, especially in visual function, when assessing recovery in nTBI.

556 Influence of Concussion History on Cognitive and Physiological Outcomes in College Athletes

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ABSTRACT

Objective: Recent research suggests that clinical recovery from concussion may not align with longer physiological recovery, and a history of concussions can affect outcomes of subsequent injuries. Our study aimed to examine how concussion history influences performance on the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT), heart rate variability (HRV), resting-state quantitative electroencephalography (rs-QEEG), as well as post-concussion symptoms and psychological health indicators, at baseline and following a recent concussion.

Methods: Data was prospectively collected within a pre-existing concussion management program. Preseason baseline included psychological health questionnaires and the ImPACT, which includes a post-concussion symptoms scale. HRV and rs-QEEG evaluations were mandatory for high-risk sports athletes (football and basketball) and optional for others

(volleyball and flag football). A total of 169 athletes (55 females) aged 16-22 completed baseline testing. Among them, 96 reported no prior concussion, 54 reported at least one, and 18 reported two or more. During the season, 30 concussion cases (8 females) were followed, of which 19 had no history of concussion, 11 had at least one prior concussion and 7 had two or more. Post-concussion assessments were conducted within 72 hours.

Results: At baseline, compared to athletes with no previous concussion, those with one or more prior concussions reported higher Vestibular-Somatic symptoms ($p = 0.003$, Cohen's $d = -0.639$), and those with two or more prior concussions displayed higher scores on the Beck Depression Inventory-II ($p = 0.004$, Cohen's $d = -0.732$) as well as elevated Cognitive-Sensory ($p = 0.001$, Cohen's $d = -0.832$), Vestibular-Somatic ($p = 0.003$, Cohen's $d = -0.762$), Affective ($p = 0.006$, Cohen's $d = -0.705$), and Total Symptoms scores ($p = 0.004$, Cohen's $d = -0.739$). No significant differences were found for Beck Anxiety Inventory, ImPACT Index Scores (Verbal and Visual Memory, Impulse Control, Visual Motor, Reaction Time), HRV or rs-QEEG values. Following a new concussion, the HRV measure RMSSD (root mean square of successive differences between normal heart beats) in standing position differed between groups, where athletes with at least one prior concussion showed lower RMSSD than those without ($p = 0.001$, Cohen's $d = 1.236$).

Discussion: Athletes with a history of concussions report more Vestibular-Somatic symptoms, suggesting they may persist longer and remain under-treated. Additionally, our study adds to the evidence for an association between a history of concussions and depressive symptoms. Even when deemed recovered, athletes with a history of multiple concussions continue to exhibit greater overall post-concussive symptoms. Finally, although the literature on this topic is sparse, both our findings and existing studies point to concussion history being associated with lower HRV RMSSD, which could reflect dysautonomia. These results add to our understanding of the physiological impacts of repeated concussions and should be considered during clinical management.

557 Validation of the TGV: Novel Tool for Assessing Practical Judgement Post-TBI

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ABSTRACT

Introduction: Practical judgment and problem-solving abilities, critical for independent daily living, are often impaired following a traumatic brain injury (TBI), particularly due to damage to the frontal lobe. However, few comprehensive and valid measures have been designed to assess these abilities. Existing measures either rely on subscales from broader cognitive batteries not specifically designed for this purpose or have been developed for an elderly population.

Objectives: This study aims to validate the Test de Gestion des problèmes de la Vie quotidienne (TGV), a novel tool designed to assess the three key phases of practical judgment: 1) Problem detection, 2) Generation of solutions, 3) Problem severity assessment.

Methods: To date, 42 participants were recruited. The preliminary sample included 21 healthy control participants (M= 46.24 years old; SD = 18.63), and 21 patients who sustained a moderate-to-severe TBI more than a year ago (M = 48.86 years old; SD = 13.24). All participants completed 5 questionnaires: the TGV, the third edition of the Adaptive Behavior Assessment System (ABAS-III), which assesses daily living autonomy, the Quality of life After a Brain Injury (QOLIBRI), the Cognitive Competency Test (CCT), which assesses general judgment, and the Brief Cognitive Exam in Traumatology (EXACT), which assesses global cognitive functioning.

Preliminary Results: Patients with chronic TBI experienced greater challenges in generating effective solutions to everyday problems and accurately assessing their severity compared to healthy control participants. The overall TGV score of patients with chronic TBI was also significantly correlated with the level of autonomy in daily living ($r = .61$), quality of life ($r = .52$), and general judgment ($r = .64$). The score from the second phase of the TGV (generation of solutions) was significantly correlated with the global cognitive functioning ($r = .67$). These results support the construct and concurrent validities of this new tool. In addition, the internal consistency of the TGV was deemed acceptable ($\alpha = .64$ to $.75$).

Conclusions: The TGV is a promising tool for professionals seeking to assess various aspects of practical judgment in patients who sustained a TBI, in a valid and precise manner. A future study will compare patients with chronic TBI who live independently with those hospitalized for moderate-to-severe TBI and deemed unable for independent living by the medical team.

558 Brief Propofol Exposure Paradoxically Increases Patient-Specific Entropy in Disorders of Consciousness

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ABSTRACT

Background: Following a severe brain injury, patients in a disorder of consciousness (DoC) have few treatment options. Zolpidem, a GABAergic agonist prescribed for insomnia, paradoxically induces arousal in some individuals. However, propofol, another GABAergic agonist and one of the most administered drugs in critical care, remains underexplored for this purpose. Given that neural complexity is hypothesized to be a necessary feature for the emergence of consciousness, we aimed to uncover potential therapeutic effects of propofol through changes in Approximate Entropy (ApEn), a measure of signal complexity, following brief propofol sedation. As a measure of signal complexity, ApEn serves as an indicator of the brain's ability to operate optimally.

Methods: We recruited 17 non-sedated patients (49.1 ± 19.4 years; 9 females) in a coma (n = 3), unresponsive wakefulness syndrome (UWS) (n = 13), or minimally conscious state (MCS) (n = 1) following a brain injury (median Coma Recovery Scale-Revised (CRS-R) score of 4.4 ± 2.9). Propofol was administered using a target-controlled infusion pump at a concentration of 2.0μg/ml and maintained for 13.7 ± 9.7 minutes. Resting state 128-channel EEG was recorded before and after the sedation period, once the concentration fell below 0.05μg/ml. The recordings underwent preprocessing using MNE Python, involving downsampling to 250 hz and bandpass filtering (0.1-50 hz). Non-scalp and noisy channels were removed, and the data were segmented into non-overlapping 10-second epochs. Epochs with excessive artifacts were then removed. ApEn was calculated over non-overlapping 10-second windows, then averaged over the whole signal for each electrode using code from the AntroPy toolbox. Intra-subject analysis involved comparing electrode pairs before and after propofol using paired samples Student's t-tests or Wilcoxon signed-rank tests, depending on the fulfillment of the normality assumption. Pearson's correlations were used to investigate the association between ApEN changes and other factors such as time since injury and etiology, and sedation duration.

Results: On a group level, ApEn was 0.458 ± 0.224 before and 0.471 ± 0.226 after propofol exposure ($p > 0.05$). On a single-subject level, 9 (53%) of the 17 patients had an increase in ApEn, 4 (23.5%) showed a decrease and 4 (23.5%) showed no variation. Sedation duration, time since injury and CRS-R score were not associated with ApEn, nor was brain injury etiology or current diagnostic category (e.g., coma, UWS, MCS) (all p-values > 0.05).

Conclusions: The observed increase in ApEn following propofol sedation in a majority of patients suggests the drug's potential to enhance complexity and functional integration in the DOC brain, aligning with zolpidem's paradoxical arousing effects noted in some individuals. This study suggests the presence of a patient-specific heterogenous effect of propofol on the DOC brain, highlighting the need for the development of personalized medicine in this field.

559 Parent-Child Interactions after Mild Traumatic Brain Injury in Early Childhood

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ABSTRACT

Background: Mild traumatic brain injuries (mTBI) are prevalent during early childhood, (i.e. from birth to five years of age). Early childhood is a sensitive period for the development of cognitive and social skills; thus, sustaining mTBI could impede their normal course. Despite this, the consequences of early mTBI are understudied. Some studies suggest that long-term difficulties in behavioral and social domains can occur (Crowe & al., 2012; Gagner & al., 2018; Lalonde & al., 2018, Yengo-Kahn & al., 2021). During early childhood, parent-child interactions are at the heart of a child's social environment and the quality of these relationships plays a critical role in the development of later social relationships (Bowlby, 1962; Ruprecht & al., 2016). The quality of parent-child interactions depends on factors related to the members of the dyad, such as parental stress and burden and child behavior (Hoff & al., 2002). Lalonde and colleagues (2020) showed that the quality of the parent-child relationship was diminished in children six months after mTBI compared to non-injured children. A recent study also shows that one-week post-mTBI, the quality of the parent-child relationship was suboptimal for most dyads (Yumul & al., 2024). However, this was an exploratory study with a small sample (n = 9). Further studies are therefore needed to explore whether parent-child interaction quality is reduced in the acute or subacute phase post-injury. This study aimed to document the quality of the parent-child relationship ten days post-injury post early childhood mTBI.

Methods: Children aged 12 to 72 months (M= 42 months; 44 boys) who sustained mTBI (n = 51) or a minor orthopaedic injury (n = 18) were recruited from three pediatric emergency departments and compared with typical developing children (community controls, n = 17). The quality of the parent-child relationship was assessed using an adaptation of the observational Mutually Responsive Orientation Scale (MRO) ten days following the injury. Interactions were coded according to three subscales of the MRO; Harmonious Communication, Mutual Cooperation, and Emotional Ambiance. A total score was computed by adding together all the subscale score.

Results: One-way ANOVA indicated that group differences in parent-child interactions neared the significance threshold, with small effect size F (2.83) = 2.971, p = 0.057, $\varepsilon^2 = 0.155$.

Conclusions: Changes in parent-child interaction quality may take time to develop following injury and may not be apparent by 10 days post-injury. Alternately, the current study may lack the statistical power to identify subtle changes that are beginning to emerge at this stage. Future work should seek to increase the sample size further and to explore associations with post-concussive symptoms.

560 Psychological Inflexibility and Its Relationship To Measures Of Cognitive Flexibility After A Moderate To Severe Traumatic Brain Injury

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ABSTRACT

Psychological inflexibility is the central component in the Acceptance and Commitment Therapy (ACT) model of human suffering and mental health, with psychological flexibility representing positive health and wellbeing. Factors involved in psychological inflexibility/flexibility are proposed to relate to executive function including cognitive flexibility. Impairments in cognitive flexibility are commonly observed after traumatic brain injury (TBI) and the possible implications that this might have for psychological flexibility/inflexibility are unknown. This study aims to examine the relationship between these constructs in moderate to severe TBI (PTA > 24 hours). A total of 66 individuals, from the Liverpool Brain Injury Rehabilitation Unit, Sydney, Australia, were administered a battery of cognitive flexibility measures (Wisconsin Card Sort Test, Trail Making Test, Controlled Oral Word Associate Test, Stroop Test, The Alternate Uses Test) in conjunction with their standard neuropsychological assessment. In addition to a general (Acceptance and Action Questionnaire-II; AAQ-II) and context specific (Acceptance and Action Questionnaire-Acquired Brain Injury; AAQ-ABI) measure of psychological inflexibility. Linear regression modelling was conducted to determine what measures of cognitive flexibility were predictive of psychological inflexibility. The context specific measure of psychological inflexibility model was significant ($F(5,57) = 4.61$, $p < .001$) and accounted for 29% of the variance in the AAQ-ABI. The Stroop colour-word interference score was the only significant measure of cognitive flexibility that predicted the AAQ-ABI ($\beta = -.14$, $p < .001$), a finding that remained after controlling for FSIQ and years of education. For the AAQ-II, the model was also significant ($F(3, 63) = 3.10$, $p = .033$) and accounted for 13.4% of the variance in the AAQ-II. Similarly, the Stroop colour-word interference score significantly predicted AAQ-II scores ($\beta = -0.13$, $p = .024$). This research provides support for the theory of executive function being an essential component of psychological flexibility and demonstrates empirical insight into these relationships. This may assist clinicians in understanding factors which may be perpetuating poor mental health in their clients with a TBI.

561 Pediatric Rehabilitation Integration in Acute Care: Navigating Storms, Tones, and Beyond in Pediatric Brain Injury – A Comprehensive Approach to Early Rehab Management, Counseling, Education, and Prognostication by Pediatric Physiatrists

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ABSTRACT

Early pediatric rehabilitation in acute care is crucial for patients with brain injuries. It allows for prompt identification and management of medical complications, such as increased tone, agitation, storming, bowel and bladder issues, and disorders of consciousness. Additionally, early engagement with rehabilitation specialists, including pediatric rehabilitation physicians, facilitates a comprehensive and coordinated approach, addressing the unique needs of these pediatric patients.

Pediatric rehabilitation physicians play a pivotal role in acute care settings, providing medical expertise and overseeing the rehabilitation process. They contribute to prognostication, helping families and care teams understand the potential long-term outcomes and plan for post-inpatient rehabilitation and long-term care.

The discussion focuses on the importance of early mobility, counseling, and family-centered care. Physical Therapy (PT), Occupational Therapy (OT), and Speech-Language Pathology (SLP) play vital roles in optimizing recovery outcomes. Effective communication and setting realistic expectations through early education with families and care teams are essential for improving patient outcomes and family satisfaction.

Post-inpatient rehabilitation care is essential for optimizing long-term outcomes in pediatric patients with brain injuries. Ongoing interdisciplinary expertise, provided through multidisciplinary clinics, is crucial for facilitating continued

recovery. Effective communication, coordination, and optimization of care among healthcare professionals are key. Pediatric rehabilitation physicians play a vital role in overseeing this care, ensuring that medical goals are met, medications are managed appropriately, and ongoing rehabilitation is tailored to the individual patient's needs.

Thus, pediatric rehabilitation physicians are essential for providing comprehensive care for children with brain injuries, from acute care to long-term rehabilitation, ensuring optimal outcomes and improving quality of life.

562 Combining Hyaluronidase With Botulinum Toxin for Spasticity Management in Brain Injury Patients: A Literature Review and Proposed Study

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ABSTRACT

Spasticity management is an important part of most Physical Medicine and Rehabilitation and Brain Injury Medicine practices. It is well known that many patients reach the limits of relief achievable through conventional treatments such as medications and chemodenervation, without complete resolution of symptoms. Intrathecal pumps are another treatment option, but not all patients can benefit from this intervention. Given this limitation, further methods for the treatment of spasticity should be investigated. One potential method is the combination of sequentially injected hyaluronidase with or without subsequent botulinum toxin injection. In this literature review, the use of hyaluronidase was explored further, both in combination with other medications and as monotherapy. Hyaluronidase has gained recognition as an adjunct therapy to chemotherapy, enhancing efficacy and bioavailability, while allowing for reduced dosages of the primary medication. Its breakdown of hyaluronan, a component of the extracellular matrix, allows for improved tissue penetration by improving diffusion between cells. Other researchers have sought to benefit from the activity of hyaluronidase with other injectable therapies, leading to the use of hyaluronidase in the treatment of diseases such as Multiple Sclerosis, Rheumatoid Arthritis, and Diabetes. Notably, Goodman et al. demonstrated that the combined use of hyaluronidase and botulinum toxin in treating hyperhidrosis reduced the amount of toxin needed for effective results. The use of hyaluronidase in combination with botulinum toxin is not novel, but its application for spasticity treatment presents a promising opportunity. The accumulation of hyaluronan is a potential factor limiting mobility or range of motion for spastic muscles, especially as individuals age with brain injury. The use of hyaluronidase as monotherapy has been seen in case studies by Rhagavan et al. to lessen spasticity temporarily in individuals with cerebral injury. This literature review has led to the intriguing hypothesis that combining botulinum toxin and hyaluronidase for spasticity management may reduce hyaluronan composition of muscle tissue while enhancing the efficacy of botulinum toxin. Further research is necessary to understand the efficacy of botulinum toxin combined with hyaluronidase compared to botulinum toxin or hyaluronidase alone in patients with a cerebral injury. Researchers could use changes in Heckmatt scale under ultrasound, improvement in Modified Ashworth Scale, or improved degree of range of motion or functional mobility as outcome measures. This study would aim to determine whether the addition of hyaluronidase enhances the therapeutic effects of botulinum toxin, potentially offering a new avenue for treatment in patients who have exhausted other therapeutic options.

563 Bringing Intensity to Brain Injury for Optimal Mobility Outcomes

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ABSTRACT

Background: There is high quality and evolving evidence for implementation of high intensity gait training (HIT) for recovery and optimization of ambulatory function in the neurologic patient population. Clinical Practice Guidelines in physical therapy presented recommendations for implementation of HIT for individuals following brain injury based on high levels of quality research in stroke and the common pathways to neuroplastic recovery shared amongst the populations. This study utilized a quasi-experimental retrospective analysis of therapeutic interventions and mobility outcomes for individuals following an acute stroke or BI who received PT services during inpatient rehabilitation from October 2021 to September 2022. Only recently has HIT focused on walking tasks been assessed in individuals with BI, and only in a chronic (> 6 months) ambulatory population, and the present data provides some insight into the utility of HIT in more impaired individuals early following BI.

Methods: During a 1-year quality-improvement initiative, therapists in a rehabilitation facility chose to provide HIT or traditional strategies to individuals with BI, with documentation of which interventions were utilized. Documented training records for each patient determined whether an individual received HIT or traditional interventions. Criteria for assignment to the HIT group included an attempt to reach ≥ 75% age-predicted HRmax, (age-predicted HRmax =208-0.7*age22) or ratings of perceived exertion (RPE) of ≥ 15 (i.e., "hard"; range: 6-20)23 while performing walking training activities. In patients prescribed beta-blockers, targeted HR ranges were reduced by 10 beats/min.

Results: Outcomes were collected at admission and discharge to delineate patterns of recovery. In individuals early BI, changes in 10-m walk test (10MWT) and Berg Balance Scale (BBS) were retrospectively compared over 1-year with physical therapists (PT) selecting to provide HIT (BI=57) or traditional interventions (BI=60). Individuals post BI receiving HIT achieved 3 to 4-fold greater gains in primary outcomes of 10MWT and BBS than individuals receiving traditional interventions (both $p<0.01$). For QI-mobility scores, while

between-group comparisons of changes were significant ($p<0.05$) demonstrating that the HIT group demonstrated greater independence with all functional mobility including ambulation and stair negotiation. However, differences in demographics and baseline assessments suggest those who were younger received HIT ($p<0.01$).

Limitations: A limitation of the present study was the use of a quasi-experimental design with unblinded assessors also delivering the interventions, consistent with routine physical therapy. An additional related limitation was the lack of randomization, which introduced selection bias of individuals to perform HIT or traditional interventions.

Conclusions: In this retrospective analysis of a quality-improvement project, attempts to prioritize walking training and achieve higher cardiovascular intensities during inpatient BI rehabilitation may have led to significant improvements in mobility outcomes. The bias observed in the data, while often assumed, may inform future implementation strategies.

564 Characteristics And Outcomes of Pediatric Survivors Of Firearm Injury To The Head: A Retrospective Chart Review

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ABSTRACT

Objective: In 2020, firearm injury became the leading cause of death among children and adolescents in the United States (US). Firearm injuries to the head have an especially high mortality rate, yet more research is needed to understand the demographics, injury characteristics, and outcomes of the patients that survive their injuries. We performed a retrospective chart review on pediatric patients who survived a firearm injury to the head in a large US city.

Design: We included patients aged 0 to 17 who presented for a firearm injury to the head at any Level 1 trauma center in Houston, Texas from January 2018 to December 2020, and survived to hospital discharge. Patient demographics and data on the initial injury were abstracted from the National Trauma Data Bank (NTDB). Trauma center electronic medical records were used to abstract any information not obtained from the NTDB, including injury-related symptoms documented in follow-up visits 3 months or later from the initial injury.

Results: There were 22 pediatric patients with head injuries from firearms included in our review, of which 18 were male. Median age was 16 years (interquartile range [IQR] 2.5 years). There were 7 Black patients, 10 hispanic patients, and 4 White Non-Hispanic patients. The most common shooting context was assault (11 instances), followed by unintentional (5 instances). Eighteen patients were admitted to the Intensive Care Unit and 16 were intubated. Median length of acute care stay was 6.5 days (IQR 8 days). Eleven patients were discharged home, and 9 patients were discharged to inpatient rehabilitation. Out of 20 patients who had follow-up visits at 3 months or later, 11 patients had at least one residual symptom.

Conclusions: Pediatric firearm injuries to the head are an infrequent but devastating event. Half of the patients in our study had residual symptoms, such as mobility deficits, persisting three months after their injury. This may result in chronic disability and affect quality of life. Therefore, follow-up and early referral to rehabilitation services is important for pediatric survivors of firearm injury.

565 Test-Retest Reliability Assessment for the Patrol Exertion Task

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ABSTRACT

Background: The Complex Assessment of Military Performance (CAMP) is a test battery that was designed to closely reflect the occupational demands of active duty servicemembers (ADSM). The test battery includes 3 subtasks of increasing complexity, with the Patrol Exertion Task (PET) administered last. The PET was developed with military collaborators to incorporate high level skills that all ADSM must be able to perform, including reacting quickly, maintaining visual stability during dynamic movements, and identifying operationally relevant information under sustained physical exertion.

Methods: 33 (average age: 27.7 ± 5.7 years) ADSM without a mTBI within the past 2 years and are relatively symptom free completed the PET during two different test sessions that were at least 4 weeks apart. Throughout the PET, the ADSM was instructed to monitor a simulated foot patrol for signs of enemy presence while continuously stepping onto a 12-inch stool. During the task, the ADSM was also instructed to respond to an auditory stimulus by pressing a button on a simulated weapon as quickly as possible to measure reaction time (RT). 12 RTs were recorded throughout the 10-minute simulation.

Results: The overall average for the 12 RTs collected throughout the simulated foot patrol was 402.2 ± 70.7ms for the first test session, and 378.8 ± 76.2ms for the second test session. The test-retest reliability was found to be moderate (ICC=0.73, p<.001, 95%CI= [0.66, 0.78]). The average for the first 6 RTs was 435.3 ± 94.3ms for the first test session, and 384.5 ± 86.2ms for the second test session. The test-retest reliability for the first half of the RTs was found to be moderate (ICC=0.62, p<.001, 95%CI= [0.49, 0.70]). The average for the last 6 RTs was 369.2 ±62.2ms for the first test session, and 373.0 ± 73.3ms for the second test session. The test-retest reliability for the last half of the RTs was found to be moderate (ICC=0.63, p<.001, 95%CI= [0.55, 0.69]).

Conclusions: The PET was designed to present a multitask challenge that is complex enough to approximate real-time challenges that ADSM face during active duty. While there is

moderate test-retest reliability for the 3 RT components of the task, further analysis is required to quantify RT performance in relation to the other cognitive tasks that are also present.

566 Pharmacological interventions for agitated behaviors in patients with traumatic brain injury: a systematic review update

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ABSTRACT

TBI is associated with decreased levels of consciousness, memory impairments, and alterations in the mental state such as confusion and disorientation. TBI can be particularly challenging due to the possible presence of posttraumatic agitation, which manifests as irritability, anger, verbal and/or physical aggression. To manage agitation, different pharmacological agents are used with limited evidence to support their efficacy and safety. In 2019, we published a systematic review assessing the efficacy and safety of pharmacological agents to manage agitation following TBI. The review failed to recommend any agent. In light of newly published research, the purpose of this systematic review was to update the review.

Methods: We included randomized controlled, quasi-experimental, and observational studies with a majority (>50%) of TBI patients (CRD42016033140). Case reports, case series, and observational studies with no control groups were excluded. All population types, from children to adults, that were either in the early stages of TBI recovery or in rehabilitation were included. To update the review from 2019, EMBASE and MedLine were searched for abstracts and articles published between Dec 10th 2018 and May 2nd 2024. In addition, references of identified article were screened for additional articles. Two reviewers screened the titles and abstracts independently for eligible publications. The eligibility of each retained study was evaluated by reviewing the full text. Disagreements of eligibility were resolved by a third reviewer. Two reviewers extracted independently data from all eligible studies using a pre-tested data extraction form. Two reviewers independently evaluated each included study with the Cochrane Collaboration tool for randomised controlled trials and the ROBINS-I tool for observational studies, respectively.

Results: In total, 3477 additional citations were identified from the literature search of which 50 were retained for full-text review. Of the 50 retained, 10 studies were included to update the systematic review. When added to the previous review, a total of 32 studies were identified. Seven of the new studies evaluate the benefit of pharmacological treatments on agitated behaviours as the presenting symptom, increasing the total to 15 studies. In two new studies, agitated behaviours were not the presenting symptom but were measured as a secondary outcome, increasing the total to 11 studies. Lastly, one new study assessed the safety of pharmacological agents used for agitated behaviours after TBI, increasing the total to 5 studies. Six of the seven studies on agitation treatment evaluated the effects of pharmacological agents not described by our initial systematic review including dexmedetomidine, haloperidol, risperidone, phenytoin, levetiracetam, butorphanol and carbamazepine.

Conclusion: Of the new agents, risperidone, carbamazepine, phenytoin, levetiracetam and clonidine failed to show any significant changes in agitation. However, studies using the alpha-2-receptor agonist dexmedetomidine and the cholinesterase inhibitor rivastigmine showed significant decreases in agitation.

567 Non-prescribed Opioid Use Increases After Incident TBI Among People Living in Precarious Housing

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ABSTRACT

Rates of TBI and opioid overdose are higher among homeless and precariously housed individuals. It is unclear whether traumatic brain injury (TBI) influences non-prescribed opioid use.

Objectives: To assess whether non-prescribed opioid use changes after incident TBI in an impoverished urban sample of people living in precarious housing.

Methods: A subset of participants of The Hotel Study, a naturalistic cohort study of health in adult residents of Vancouver's poorest downtown neighbourhood (N>500, c. 2008), who participated in a nested study focused on the consequences of TBIs, were monitored monthly for TBI via the Ohio State University screening questionnaire. Eighty-five sub-study participants who acquired 1+ TBI (2016–2019), were each matched to 2 other Hotel Study participants without a record of TBI (N = 170 'controls'), based on age, gender, subjective health status at baseline, and opioid use in the pre-injury months (total N = 255). All participants attended monthly self-report (Time-Line-Follow-Back) substance use assessments in the year surrounding the captured TBIs.

Analysis: We used a mixed effects model to assess change in frequency of non-prescription opioid use (days used per week) after incident TBI. Assessments in the 6 months before and after TBI were modelled, using a zero-inflated binomial distribution. A group (injured vs. 'controls') by time (relative to injury) term was included to index differential change in

opioid use after the time of the injured participant's TBI, between injured participants and their controls.

Results: Opioid use increased uniquely after TBI, as indicated by significant group-by-time interactions (ps<.044). Results indicate those with TBI were uniquely more likely to use opioids in any given week in the 6 months after their injury versus before (odds ratio / OR for group(TBI)-time(after TBI), zero-component: 0.18 [0.04–0.83]), OR: time, zero-component : 0.80 [0.22–2.91]). Moreover, opioids were used around 32% more frequently per week after one's TBI versus before (OR: group-time, conditional component: 4.01 [1.04–15.36], OR: time, conditional component: 0.33 [0.09–1.14]). Opioid use did not change significantly over time in the year surrounding injuries for the non-injured 'matched controls', nor was it different overall between groups (injured vs. controls; ps: .079–.742). Gender differences in opioid use were not apparent (ps: .378–.799), although older age was associated with less use (OR: age, conditional component: 0.92 [0.86–0.99], OR: age, zero-component: 1.06 [0.99–1.14]). Data from participants in the sub-study indicate largely substantial concordance of self-reported opioid use with urine drug screen results, with the exception of fentanyl (κ morphine = 0.63, κ methadone = 0.92, κ fentanyl = 0.12).

Conclusions: Traumatic brain injury is associated with increased non-prescription opioid use in the subsequent 6 months and may represent a modifiable risk factor for opioid use disorder and overdose.

568 The Impact of Metacognitive Strategies on Executive Functioning in Traumatic Brain Injury Patients

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ABSTRACT

Background: Executive functioning and self-awareness may be significantly impaired in individuals with mild traumatic brain injury (TBI), compromising social well-being and quality of life. According to established TBI treatment guidelines, metacognitive strategies are recommended to increase motivation, awareness of strengths and deficits, and strategies for increased attention. However, there is limited data on their efficacy. We report preliminary results from a controlled trial of computerized cognitive training with metacognitive strategies paired with non-invasive brain stimulation in Veterans with mTBI.

Methods: Participants were aged 18-69 years, had suffered a mild TBI, and all had subjective post-TBI cognitive deficits. All participants received sixteen 10-minute sessions of repetitive transcranial magnetic stimulation (rTMS) or transcranial direct current stimulation (TDCS) or sham combined with 30 minutes of attention processing training (APT-3). During APT-3, participants were scored on a 100-point scale in the following attention processing domains: 1) sustained attention, 2) selective attention, 3) working memory, 4) suppression, and 5) alternating attention. Preset metacognitive strategies were introduced or revisited following each completed session to reinforce their use within the study and also emphasize self-awareness in the participant, making these strategies more generalizable. During each session, the use of metacognitive strategies was recorded and classified by research staff (e.g., skills of task completion, motivation/self-efficacy, task understanding). The correlation between the number of metacognitive strategies used, task accuracy, and global impression of change was calculated for the global cohort.

Results: Eight participants were included in the analysis. Participants improved in all domains of APT-3 (with an average of2 84.2% accuracy score at session one and a 96.8% accuracy score by session 16). Increases were seen in all individual domains (suppressed attention 86% to 97%, alternating attention 66% to 94%. selective attention 61% to 100%). Additionally, it seems that there is a correlation between improved accuracy scores and increased use of metacognitive strategies as the participants applied on average 2 to 3 more strategies while completing attention processing training. The study is ongoing and as we continue to collect data, we will follow these trends and determine their significance in addition to determining if there is an additional correlation with perceived improvement from the global impression of change questionnaire. This continued analysis could help validate the claim that metacognitive strategies could help improve cognitive rehabilitation for individuals with traumatic brain injuries.

569 Strain In The Game: Key Predictors Of Concussion Risk In Canadian Collegiate Football

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ABSTRACT

Introduction: Sport-related concussions (SRC) in contact sports like football pose a significant risk due to their potential for long-term cognitive and neurological consequences. While head acceleration events (HAEs) are well-documented through sensors measuring head kinematics, the mechanisms that lead to SRC remain poorly understood. Despite significant research on SRC in professional and collegiate American football, a gap remains in understanding this injury within Canadian collegiate football, particularly in identifying key predictors of SRC risk. Accordingly, this study integrates sensor data and finite

element analysis (FEA) to develop concussion risk models specific to Canadian collegiate football players.

Methods: Western University football players' HAEs were recorded during games and practices using helmet-mounted sensors. A retrospective chart review identified athletes who received a SRC diagnosis during the study period. Of these, 45 hAEs were identified that resulted in a SRC. A set of four non-concussive HAEs per SRC, representing the full spectrum of HAEs, was randomly selected using tertiles of linear and rotational brain injury metrics. Each HAE was characterized using Head Injury Criterion and Brain Injury Criterion (BrIC) brain injury metrics, as well as Peak Linear Acceleration (PLA), and Peak Rotational Velocity. The HAEs were simulated using FEA with the Global Human Body Models Consortium 50th percentile adult male head model. This analysis provided estimates of the 95th percentile maximum principal strain (MPS) across various brain regions and calculated cumulative strain damage measure (CSDM) at multiple thresholds. Univariate logistic regression analysis assessed the relationships between various brain injury metrics, brain strains and the likelihood of concussion.

Results: Univariate logistic regression identified BrIC as a strong predictor, with an odds ratio (OR) of 1.12 (95% CI: 1.08 – 1.15) per 0.01-unit increase with a 50% probability of concussion (50POC) at 0.46. The model demonstrated strong predictive power with an area under the receiver operating characteristic curve (AUROC) of 0.929, and a Nagelkerke's Pseudo R2 of 0.565. Cerebellar MPS had an OR of 1.60 (95% CI: 1.41 – 1.82) per 0.01-unit increase and a 50POC at 0.10 (AUROC = 0.907, R2 = 0.49). CSDM10 showed strong predictive power with an OR of 1.08 (95% CI: 1.06 – 1.10) per 0.01-unit increase and a 50POC at 0.53 (AUROC = 0.919, R2 = 0.57). All predictors investigated achieved AUROC above 0.900, except the PLA (AUROC = 0.889).

Discussion: The findings indicate that specific head kinematic metrics and brain strain outputs from FEA are effective predictors of concussion in Canadian collegiate football. These results highlight the importance of head kinematic-based injury metrics and strain measures in concussion risk modeling. Future research should focus on integrating these biomechanical predictors into comprehensive risk assessment tools. The development of these predictive models could enhance injury prevention efforts in contact sports.

570 Connectomic Abnormalities in Concussed Individuals with Predominantly Headache Symptoms: Whole-Brain Analysis using Resting-State fMRI

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ABSTRACT

Background: Headache is one of the most common and long-lasting post-concussion sequelae, with debilitating effects on patient quality of life. However, since it often presents concurrently with an array of other cognitive, somatic and emotional symptoms, it remains unclear whether headache is associated with distinct alterations in brain physiology, limiting our ability to improve on current interventions and management guidelines. To address this gap, the present study examined whether a predominantly-headache symptom presentation was associated with distinct patterns of functional connectivity in the brain.

Methods: A total of 102 concussed athletes were assessed in the first week of injury, along with 145 uninjured athletic controls, all recruited from a single university sport medicine clinic. All athletes were imaged on a 3T MRI system, and resting-state functional MRI was used to measure functional connectivity between brain regions using a standardized 246-region atlas. Symptoms were assessed concurrently with imaging via the Sport Concussion Assessment Tool (SCAT), and symptoms were ranked in severity per participant. Initial analyses examined the relative prevalence of headache-related symptoms ("headache", "pressure in head"), followed by correlating relative symptom severity against pairwise functional connectivity.

Results: among the symptoms, both "headache" and "pressure in head" were consistently most highly ranked ($p < 0.001$, Friedman test). Subsequent analyses determined that increased relative severity of "headache" and "pressure in head" was associated with reduced connectivity of the insula and basal ganglia, respectively. Symptom frequencies and connectivity effects exceeded those seen in uninjured controls.

Conclusion: These findings provide new evidence that predominantly-headache symptom subtypes may have distinct functional abnormalities, with implications for patient management and the development of novel interventions.

571 A Between Groups Analysis of Reaction Time for the Patrol Exertion Task

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ABSTRACT

Background: The Patrol Exertion Task (PET) is a subtask within the Complex Assessment of Military Performance (CAMP) test battery. The task was designed for multitask assessment, and active duty servicemembers (ADSM) are instructed to monitor a simulated foot patrol on a screen while holding an instrumented weapon that makes audible signals at pre-programmed times. The auditory signals serve as cues for reaction time (RT) responses, which are collected by pressing a button on the instrumented weapon. The task is completed under conditions of sustained exertion where the ADSM is asked to continuously step onto a 12-inch stool throughout the duration of the 10-minute task. Additional elements that are collected during the task include heart rate, rate of perceived exertion, and other cognitive components that require the ADSM to identify and recall specific elements that are located throughout the simulated patrol.

Methods: The purpose of this study is to compare performance on the PET between ADSM who are seeking treatment for persistent mTBI symptoms with a peer group of ADSM who may have a history of mTBI but are relatively symptom free and have not had a mTBI within the past 2 years. 57 ADSM (average age: 27.6 ± 6.4 years) were recruited for the healthy control (HC) group and 60 ADSM (average age: 30.9 ± 7.3 years) were recruited for the mTBI group.

Results: The overall average for the 12 RTs collected throughout the simulated foot patrol was 419.0 ± 86.1ms for the HC group, and 455.0 ± 144.5ms for the mTBI group, but the overall RT average was not statistically significant (t = -1.6312, df = 97.076, p-value = 0.1061, 95%CI = [-79.75, 7.80]). When the RTs were binned into quarters (3 RTs per bin), there was an overall trend of RT improvement throughout the task (HC: 1st quarter = 457.1ms, 2nd = 447.7ms, 3rd = 382.9ms, 4th = 392.2ms) (mTBI: 1st = 510.9ms, 2nd = 467.5ms, 3rd = 424.0ms, 4th = 415.1ms) but only one group showed statistical significance (1st quarter: t = 1.9441, df =101.33, p-value = 0.05, 95%CI = [-108.76, 1.09]).

Conclusions: The PET was designed to test ADSM ability to multitask under exertional conditions, and they are asked to balance multiple cognitive and motor tasks simultaneously. The reaction time data alone suggest that the mTBI group initially struggles to engage with the RT component of the task, but quickly develop a strategy to complete the task that is comparable to the HC group. Analysis of the additional cognitive components of the PET will be completed to further contextualize the RT results.

572 Type of Kick Influences Brain Strain in Youth Male Soccer Athletes

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ABSTRACT

Background: Head impacts in soccer have been associated with both short- and long-term neurological consequences. Youth players' brains are especially vulnerable given that their brains are still developing. Approximately 90% of head impacts in soccer occur from purposeful heading. Kinematic head impact magnitudes differ depending on the type of kick they originate from. Brain strain, a measure of brain damage, is correlated with kinematic head magnitudes.

Purpose: Accordingly, this study assessed the relationship between type of kick and brain strain during purposeful headers in male youth soccer players.

Methods: A prospective cohort study of a single elite male under-13 youth soccer team of 18 players (two forwards, nine midfielders, five defenders, two goalies) was conducted for one playing season. Players wore instrumented mouthguards to quantify head impact magnitudes during practices and games. Purposeful heading events were categorized by type of kick (e.g., deflection, punt, free kick, throw-in, pass in air, other) for 49 practices and 23 games. Finite element model simulations with the Global Human Body Models Consortium 50th percentile adult male head model were performed on each of the headers to calculate average (MPS) and 95th percentile (MPS95) maximum principal brain strain. Linear mixed effects models evaluated whether type of kick predicted brain strain with individual and event differences entered as random effects.

Results: A total of 362 head impacts were measured during the season, 125 of which occurred during games and 237 during practices. The median (IQR) linear acceleration and rotational velocity of all head impacts was 14.7 (7.2) g and 7.5 (8.8) rad/s. Type of kick significantly influenced MPS (F5=2.91, p=0.014). Punts (0.072, 95% CI [0.055, 0.089], p = 0.016), free kicks (0.064, 95% CI [0.055, 0.073], p = 0.006), and passes in air (0.060, 95% CI [0.054, 0.067], p = 0.003) significantly increased MPS compared to deflections (0.051, 95% CI [0.045, 0.058]). Type of kick also significantly influenced MPS95 (F5=2.42, p=0.037). Punts (0.143, 95% CI [0.108, 0.177], p = 0.019), free kicks (0.123, 95% CI [0.104, 0.141], p = 0.022), and passes in air (0.119, 95% CI [0.106, 0.131], p = 0.006) significantly increased MPS95 compared to deflections (0.101, 95% CI [0.088, 0.115]).

Conclusion: These results suggest that certain types of kicks such as punts, free kicks, and passes in the air pose a higher risk for increased brain strain in youth male soccer players, which could have implications for injury prevention strategies in the sport. Coaches should be encouraged to emphasize playing the ball along the ground and minimize unnecessary head impact exposures during practice sessions.

573 Critical Gaps in Physician Practice Regarding Post-fall Concussion in Older Adults and Individuals with Neurodegenerative Diseases

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ABSTRACT

Introduction: Falls are the primary cause of mild traumatic brain injury/concussions. Older adults and those with neurodegenerative diseases are at very high risk for falls, and consequently at highest risk for sustaining concussions. Concussion rates in the older population and those with neurodegenerative diseases is largely unknown. The rates reported in recent studies is lower than expected in this demographic, and there is limited data in those with neurodegenerative disease as they are usually excluded from studies. A combination of under-reporting of falls and a lack of awareness regarding potential consequences of falls (especially head injury), results in the underdiagnosis of post-fall issues and concussions in these population. We aimed to conduct a quality assessment survey to assess clinical practice regarding falls and general knowledge of concussion symptoms in North American physicians.

Methods: We sent surveys inquiring about physician practice regarding falls and concussions through email to 1400

North American physicians working at university affiliated hospitals and who specialize in caring for older adults and patients with neurodegenerative diseases.

Results: 141 physicians (neurologists, geriatricians, primary-care physicians, psychiatrists), more than 78% of whom saw Parkinson's disease, Alzheimer's disease, dementia, or older adult patients weekly, responded to the survey. 71.4% of physicians either never inquired or inquired in less than 5% of their neurodegenerative disease or older adult patients, about history of falls. Over half of the physicians (51.8%) either never ask or do not consider it necessary to ask about concussion symptoms after a patient or caregiver reports a fall. The majority of the physicians (92%) knew that concussions can have lasting effects on patients and 99% of respondents recognized that a concussion could worsen their patient's cognition and mood. Over 70% of responding physicians believed that their patients can fully recover from a concussion with the same probability as any other age group if treated. Only 50% felt confident in managing post-concussion symptoms themselves.

Conclusions: Our results highlight a gap in practice amongst physicians in regard to falls and possible concussion in older adults and those with neurodegenerative diseases. The rate of physician inquiry about history of falls and concussion symptoms is very low. Failure to recognize a concussion after a fall can lead to missed opportunities for targeted interventions to address reversible symptoms. The misattribution of post-concussion symptoms to disease progression may exacerbate or accelerate symptoms of neurodegenerative disease. Due to exclusion criteria for upper age and pre-existing neurological conditions in most studies on mTBI, it is unknown how post-concussion symptoms manifest in older adults and those with neurodegenerative disease, even though they are the demographic at highest risk

574 Prevalence of Intimate Partner Violence-Related Traumatic Brain Injury in the National Trauma Data Bank and Traumatic Brain Injury Model Systems: 2007-2021

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ABSTRACT

Background: Intimate partner violence related traumatic brain injury (IPV-TBI) is prevalent and understudied in the United States, and injury surveillance in the clinical setting is limited. Understanding data limitations is critical to understanding the importance of the issue to inform resource allocation and future advancements for violence-related traumatic brain injuries.

Objectives and Methods: This current study utilized a cross-sectional design to explore the prevalence of IPV-TBI in adults utilizing ICD 9/10 external cause of injury codes across the Traumatic Brain Injury Model Systems (TBIMS) and the National Trauma Data Bank (NTDB) from 2007-2021. The primary outcome was prevalence of IPV using International Classification of Diseases (ICD) external cause of injury codes. Secondary outcomes were prevalence of any violence-related TBI, strangulation, and rape using ICD external cause of injury codes. Demographic and injury characteristics were stratified by individuals with and without IPV, and significant testing was performed to determine statistical differences.

Results: Of 11,824 subjects in the TBIMS, 878 (7.4%) had violence-related TBI, of which, n=125 (14.2%) were women and n=752 (85.6%) men. There were <5 subjects with IPV (all women), 0 subjects with strangulation, and <5 subjects with rape codes. Researchers were unable to perform statistical testing in the TBIMS dataset due to low prevalence of IPV. Out of 3,305,827 subjects in the NTDB, n=332,886 (10.1%) had a violence-related TBI, of which n=50,311 (15.1%) were women and n=281,756 (84.6%) men. There were n=3,392 (0.1%) subjects with IPV (n=3,012 (88.8%) women and n=375 (11.1%) men); n=427 (0.0%) subjects with strangulation (n=260 (60.9%) women and 166 (38.9%) men); and n=684 (0.0%) with rape codes (n=530 (77.5%) women and n=154 (22.5%) men). Within the NTDB, all demographic (age, race, ethnicity, sex, payer) and injury characteristics (length of acute hospitalization, Glasgow Coma Scale, discharge disposition) differed significantly between those with IPV and those without IPV, and a large effect size was noted with age. IPV, strangulation, and rape external cause of injury codes were low across all years in the NTDB and negligible in the TBIMS dataset, with strangulation and rape coding rates declining in 2016-2021 after the ICD-10 transition.

Discussion: Injury surveillance using external cause of injury codes for the overlap of IPV and TBI are likely underutilized in the clinical setting, and prevalence of IPV-TBI was low in two large national datasets. ICD external cause of injury categorization for TBI and IPV is an inexpensive and widely available approach for prevalence estimation. Interdisciplinary (clinical, legal, and community) collaborators should examine federal and state policies for IPV-related TBI injury surveillance, identify best practices, and generate recommendations for screening, treating and documentation. ICD coding guidance to improve injury surveillance could be separated from mandatory reporting laws to improve uptake of IPV coding documentation.

575 Considerations for Conducting Research on Intimate Partner Violence-Related Brain Injury: Lessons Learned from a National, Multi-Site Study

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ABSTRACT

Introduction: Intimate partner violence (IPV) is a major public health concern that affects approximately one in three women in their lifetimes. Physical IPV can involve injuries to the head, neck, or face, leading to a high risk of head trauma (IPV-HT) and probable brain injury (BI). Compared to other forms of HT, IPV-HT presents as a unique phenotype because the mechanisms of injury (i.e., non-fatal strangulation, blunt force trauma, violent shaking, co-occurring mechanisms) are uncommon in other etiologies. More research unmasking the myriad of effects of IPV-HT is urgently needed. However, individuals with IPV-HT represent a vulnerable population with specific needs that must be considered when conducting this type of research.

Methods: Our team is conducting a US-based multi-site study characterizing the cognitive, psychological, and neural outcomes associated with IPV-HT among cisgender women. Thus far, we have completed assessments in 110 women. Study team members identified 5 unique methodological considerations and challenges encountered while working with this population.

Results: 1) Balancing Recruitment Goals with Participant Safety. Approximately 45% of participants were excluded or were not contacted for scheduling due to safety concerns (e.g., experiencing current IPV). 2) Training in Trust and Transparency. Working with IPV survivors requires extensive training. Researchers must build trust and be transparent about research requirements and potential impact. A comprehensive description of the research procedures/expectations is needed, particularly for survivors who may feel betrayal from individuals they trusted and were responsible for their traumas. 3) Research Procedures Invoking Emotional Reactions. Neuroimaging can provide a wealth of injury-specific information. However, its use must be balanced with survivor comfort. A small proportion of our participants experienced heightened reactions to the environment/machine (e.g., banging noise, closed space). 4) Maintaining Standardized Protocols while Validating Participants. BI screening instruments and neuropsychological assessments require standardized administration. However, some flexibility is needed for this trauma-exposed population. It is helpful to provide additional encouragement and empathy, without invalidating results, to minimize the effects of posttraumatic stress disorder (PTSD) symptoms, such as negative feelings about self. 5) Lack of IPV-HT Specific Research Tools. Many of the assessments used in IPV-HT research were developed for BI sustained outside of the unique context of IPV and limited work has been done on the psychometric validation in this population. Incorporation of survivors, participants, and IPV-HT researchers' experiences is needed to accurately characterize how the combination of IPV, PTSD, and BI uniquely affects outcomes among those with IPV-HT.

Conclusion: Working with IPV survivors requires a unique trauma-informed approach. We provide lessons learned from our team to help others design and implement studies to ensure that their research objectives are obtainable while balancing participant needs.

577 Using The RTSS As A Framework To Build An Integrated Rehabilitation Program For One Artist– A Co-designed Case Study In Returning To The Joy Of Art After Acquired Brain Injury

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ABSTRACT

On June 18, 2024, Anne, like thousands of others around the world, experienced a stroke. Her life was instantly and dramatically altered, but one constant remained: her unwavering passion for art. In the hospital, Anne engaged in speech, occupational and physical therapies to address the impairments that now defined her daily life. Despite her progress, she required further rehabilitation and could not return home immediately. This led her to CONNECT Communities in Hamilton, Ontario, a residential program that offers a different approach to recovery.

CONNECT Communities, with locations in Ontario and British Columbia, Canada, is a rehabilitation program that has been operational for over 30 years. It is grounded in the Life Redesign Model of Rehabilitation, which focuses on maximizing neuroplasticity by centering all services around what the person, like Anne, wants to achieve in life. This model employs a coaching approach rather than a traditional therapist model, with multiple daily opportunities to practice meaningful tasks in environments that closely resembled her own, allowing her to integrate new skills naturally in real-life activities that contrasted the typical once-a-week therapy sessions she had experienced. For Anne, this meant her rehabilitation journey was driven by her desire to return to her home and her passion for art. The literature on rehabilitation suggests that this

contextually based approach leads to better generalization of skills, enhancing long-term outcomes beyond the clinical environment.

While grounded in best practice, implementing an interprofessional, participation-focused program like Life Redesign presents specific challenges, such as clearly delineating each team member's role while maintaining a cohesive and integrated approach. Without precise definitions of each professional's contributions, it can be challenging for individuals like Anne and their families to fully appreciate the value of the interventions provided. Moreover, identifying and specifying the unique components of this participation-focused approach is essential for research and replication.

To address these challenges, the Rehabilitation Treatment Specification System (RTSS) was utilized. By including Anne's Life Redesign Goals, identifying specific AIMS and TARGETS, and identifying the necessary INGREDIENTS, it meant that not only did everyone involved have a map, but they also had a clear destination. Using this framework not only supported Anne in her journey back to her art but also ensured that the interventions were clear, replicable, and researchable.

This presentation will delve into the Life Redesign Model and demonstrate how the RTSS can be used to specify clinical interventions within an integrated team. With Anne as part of the team and sharing her story, we demonstrate how by focusing on what individuals want more of in life—such as her return to the canvas—it can drive effective and meaningful rehabilitation outcomes.

578 Using The Rehabilitation Treatment Specification System (RTSS) To Identify Themes Of Life Redesign Plans That Bridge The Need For Specification And Finding Meaning For People Living With Acquired Brain Injuries

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ABSTRACT

Individuals living with the effects of Acquired Brain Injury frequently describe their experiences as 'isolating,' 'confusing,' 'frustrating,' and 'exhausting.' Rehabilitation aims to alleviate this suffering through structured, goal-oriented interventions. Best practice emphasizes that those interventions should be grounded in the everyday contexts of a person's daily life. Likewise, for decades, rehabilitation literature has consistently recommended that outcomes are maximized when interventions are implemented within real-world environments by engaging individuals in meaningful activities aligned with their personal aspirations and social roles. However, what remains insufficiently addressed is how to translate these personal goals into targeted rehabilitation programs. Without this information, clinicians often return to traditional rehabilitation interventions that focus on impairment-driven outcomes without explicit alignment with the individual's broader goals. The Life Redesign Model of Rehabilitation is an exception, as this model explicitly puts the individual's personal goals at the center of all rehabilitation activities. The Life Redesign Model is the foundation of CONNECT Communities, a participation-focused rehabilitation facility located in both Ontario and British Columbia Canada. At CONNECT Communities, people are supported in their recovery by prioritizing what an individual seeks to achieve in their life post-injury and building rehabilitation programming into that. The in-house, interdisciplinary team, comprised of regulated and unregulated professionals, employs a coaching approach to support residents during meaningful, real-world activities. Through close collaboration among staff, families and most importantly the individual themselves, a Life Redesign Plan is developed and is central to this model and the rehabilitation. One challenge inherent in such a plan is that real-life is complex and transcends traditional therapeutic environments. As the rehabilitation offered at CONNECT Community is integrated and interdisciplinary, so to address the real-life needs of the people being supported on their rehabilitation journey, it is necessary to have a clear path. To aid in the development of plans that have both the necessary specifications for effective rehabilitation and maintain the spirit of Life Redesign, CONNECT Communities has embraced the use of the Rehabilitation Treatment Specification System (RTSS). The RTSS is a conceptual framework that allows clinicians to describe and categorize treatments. Using the RTSS Framework to organize, specify and describe Life Redesign Plans, CONNECT Communities is able to better analyze the interventions and help people understand the complexities of rehabilitation and participate. This presentation will share the outcomes of a study designed to analyze the common themes, including aims, targets and necessary ingredients that make up the Life Redesign Plans of a preliminary set of people residing at CONNECT Communities located in Hamilton, ON. By incorporating the use of the RTSS into Life Redesign Plans, it is possible to help people turn the negative experiences of life after brain injury into experiences that now include joy, fulfillment and meaning.

579 The Relative Timing of Stages of The Return to Play Protocol and the Association Between Common Profiles and Complete Recovery in Collegiate Student-Athletes

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ABSTRACT

Background: Both the Consensus Statement for Concussion in Sport Group and the National Athletic Trainers' Association position statement for concussion management recommend a graduated progression for return to sport and academic activities after concussion. A recent study provided first evidence that recovery following sport-related concussion is affected by the sequence in which collegiate student-athletes advance through stages of the consensus-recommended return-to-play (RTP) protocol. Also recently, an update to that protocol recommends initiating exercise before symptom

resolution. We investigated recovery profiles in varsity student-athletes to identify common sequences and whether profiles are differently associated with recovery timelines.

Methods: In the Ivy League-Big Ten Epidemiology of Concussion Study, a multisite prospective cohort study, we identified the order of 1) symptom resolution and initiating 2) exertional activities and 3) academic activities after concussion onset in each athlete. For each sequence identified, we determined its frequency and, using Kaplan-Meier curves, the median days to complete RTP recovery.

Results: We identified 13 sequences of recovery in 2,640 student athletes with sport and non-sport related concussions. The median RTP was 14 days and medians ranged from 10 to 19 days depending on the sequence. The most common sequences included academics < symptom resolution < exertional activities (28%) and academics < symptom resolution = exertional activities (24%) which had median RTP of 17 and 14 days, respectively. Shorter median RTP of 12 occurred when symptom resolution = academics < exertional activities (11%), and 13 occurred when symptom resolution = exertional activities < academics (7%). Longer median RTP of 17 occurred when academics < symptom resolution < exertional activities (28%), and 19 occurred when academics < exertional activities < symptom resolution (8%).

Discussion: Notably, these findings suggest student-athletes with sport and non-sport related concussion mechanisms progressions through stages of RTP protocol are not uniform. Furthermore, recovery profiles varied considerably in median days to the final RTP outcome. Student-athletes and sports medicine teams may progress through RTP protocols based on many factors including symptom severity, personal health history, and prioritize clinical management decisions to return to academics and sports. These factors, and our findings, highlight the need to tailor concussion management approaches to ensure concussion recovery is neither rushed or delayed unnecessarily and student-athletes and concussion management teams should balance the safe and efficient return to sport and academics.

580 Pre-Post Intervention Assessment for Active Duty Servicemembers with mTBI using the Patrol Exertion Task

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ABSTRACT

Background: The Complex Assessment of Military Performance (CAMP) test was designed for use by physical therapists to aid in return-to-duty recommendations. The purpose of this observational study is to evaluate performance on components of the CAMP test battery for ecological validity and to improve outcome measure development. The Patrol Exertion Task (PET) is a subtask within CAMP that was designed for multitask assessment, and active duty servicemembers (ADSM) were instructed to complete cognitive and motor tasks while watching a 10-minute simulated foot patrol. Throughout the simulation, an instrumented weapon is used to collect reaction time (RT) performance by recording the time it takes for the ADSM to push a switch after hearing a preprogrammed auditory cue.

Methods: 31 ADSM (average age: 33.0 ± 6.7 years) who have sustained a mTBI within the past 2 years and were seeking treatment for persistent symptoms were recruited for the study. Pre- and post-intervention data were captured via the PET to quantify changes in performance after completion of a prescribed intervention. 12 RTs were recorded throughout a simulated foot patrol with a sustained exertion task of continuously stepping onto a 12-inch stool.

Results: The overall average for the 12 RTs collected throughout the simulated foot patrol was 437.3 ± 114.4ms for the first test session, and 392.0 ± 71.8ms for the second test session, and the pre-post improvement in RT was statistically significant (t = 2.597, df = 30, p-value = 0.014, 95%CI = [9.65, 80.83], mean differences between pairs = 45.25). The average for the first 6 RTs collected was 476.4 ± 110.5ms for the first test session, and 398.3 ± 73.5ms for the second test session, and the pre-post improvement was statistically significant (t = 4.648, df = 30, p-value = 6.28e-05, 95%CI = [43.78, 112.41], mean differences between pairs = 78.09). The average for the last 6 RTs collected was 392.9 ± 126.0ms for the first test session, and 387.6 ± 79.3ms for the second test session, but the pre-post change was not significantly significant (t = -0.3486, df = 28, p-value = 0.7226, 95%CI = [-41.57, 29.18], mean differences between pairs = -6.19).

Conclusions: There was statistically significant improvement in RT for the full PET and the first 6 RTs, however the improvements for the last 6 RTs were minimal. The PET was designed to test ADSM ability to multitask under conditions of exertion, so the variation in RT performance throughout the task may suggest that there are lingering post-mTBI effects that are difficult to identify from single-task assessment alone.

581 Understanding Meaningful Connections in Traumatic Brain Injury Peer Support

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ABSTRACT

Background: Peer support has been recognized as a promising intervention for people with traumatic brain injury (TBI). Peer support has shown to increase feelings of community, positive mood, and acceptance of their injury for people with TBI. Although there is a quantitative understanding of the benefits of peer support after TBI, there is little known about how meaningful connections are created during peer support intervention. AIMS: This study aimed to 1) characterize how meaningful connections are developed through

peer support; and 2) identify barriers and facilitators of creating meaningful connections through peer support.

Methods: Qualitative data were collected through semi-structured interviews and analyzed using constructivist grounded theory. We recruited three groups of participants: (1) adult participants with recent TBI < 6 months to receive peer support; (2) participants who experienced a brain injury > 2 years prior to serve as peer support workers; and (3) community partners to be involved in the implementation of peer support (e.g., participant matching, recruitment).

Results: Nine participants were included in our study: three people receiving peer support, two peer support workers, and four community partners. Data analysis identified four themes that described the experiences of meaningful connections and barriers and facilitators of these connections. First, 'sharing experiences of brain injury' explored the importance of having experiences after a TBI understood and validated. Second, 'relating within a similar place' highlighted the value of insights on navigating milestones and life events. Third, 'expanding meaningful conversations' indicated participants' desire to connect on personal topics other than TBI. Last, 'co-occurring growth' identified how reciprocal learning occurs between both the peer support receiver and worker.

Conclusions: Findings from this study can help future peer support programs to facilitate meaningful connections, and therefore, improve the experience and outcomes of peer support.

582 Benzodiazepine Use For Severe Refractory PSH In A Young Adult

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ABSTRACT

This is the case of a 28-year-old female athlete with past medical history including asymptomatic Ebstein anomaly who suffered anoxic brain injury after unwitnessed out-of-hospital cardiac arrest with unknown downtime requiring cardiopulmonary resuscitation and automatic external defibrillator shock three times prior to return of circulation. The patient was admitted to inpatient rehabilitation where her course was remarkable for severe paroxysmal sympathetic hyperactivity (PSH) and paroxysmal autonomic instability with dystonia. PSH is a syndrome of dysregulated sympathetic outflow resulting in episodes featuring vital sign derangement and increased motor tone and posturing. This patient with anoxic brain injury in the context of robust cardiovascular reserve displayed severe and persistent PSH. In addition to careful multidisciplinary management involving personalized nursing and therapy efforts, the treatment of this patient's PSH included a stepwise amplification in pharmacotherapy based on clinical practice guidelines. Nevertheless, the patient's PSH remained refractory to high doses of gabapentin, propranolol, and baclofen, as well as treatment with clonidine, dantrolene, transdermal fentanyl, enteral hydromorphone, and intravenous morphine. Her course was complicated by pain, contracture development, pressure injury, and cortical atrophy. The dysautonomic signs and symptoms remained poorly controlled until the patient was started on scheduled intravenous diazepam. Benzodiazepines have been utilized as treatment for PSH symptoms including abnormal tone; however, its broader use among patients with brain injuries is often limited due to concerns for its effects on cognition and neurorecovery. Here we present the case of a young, previously healthy female whose anoxic brain injury led to severe autonomic dysfunction and dystonia requiring relatively high dose intravenous benzodiazepines to achieve adequate control. We conclude that judicious use of benzodiazepines may provide a valuable tool in young, otherwise healthy patients for early control of dysautonomic tone to prevent secondary complications following brain injury.

583 Exploring Predictors of Return to Work Outcomes in Adults Presenting to the Emergency Department with Acute Concussion

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ABSTRACT

Background: In most adults, concussion symptoms resolve within 4 weeks, but up to 30% experience persistent symptoms beyond one month, affecting their return to work (RTW). This study aimed to identify factors predicting prolonged RTW at 6 weeks post-injury.

Methods: We recruited adults (18-65 years) diagnosed with concussion (ACRM 2023 criteria) from Foothills Medical Centre Emergency Department (ED; Calgary, AB) within 7 days of injury. During their initial visit, participants completed demographic questionnaires including information about their current occupation and injury characteristics (i.e. mechanism of injury and previous concussions). Information on RTW at 6-weeks post-injury was collected as part of the Extended Glasgow Outcome Scale (GOS-E). Descriptive statistics, one-way ANOVA, and multinominal logistic regression tests were used to describe and compare three groups: 1) those who returned to work at full capacity (Full RTW); 2) those who returned to work at a reduced capacity (Partial RTW); and 3) those who had not returned to work (No RTW), at 6-weeks post-injury.

Results: Seventy-eight adults with concussion were recruited from the ED (51% female, 39.1 ± 13.3 years). At 6 weeks post-injury, 32 (41.0%) individuals were lost to follow-up/withdrew, 28 (35.9%) had a full RTW, 10 (12.8%) had a partial RTW, and 8 (10.3%) had no RTW. Those who were lost to follow-up differed in age from individuals who did not return to work (Dropout 34.8 ± 12.6, No RTW 48.6 ± 8.3,

p=0.01), but did not differ from those who remained enrolled in the partial and full RTW groups. The three RTW groups did not differ in age or sex (Full 42.9 ± 13.7, 23.9% female; Partial 34.3 ± 11.3, 17.4% female; None 48.6 ± 8.28, 10.9% female; p=0.055 and p=0.07, respectively). In the multinomial regression, age (x^2=10.94, p=0.004), sex (x^2=20.62, p<0.001), pre-injury occupation (x^2=32.75, p=0.008), and mechanism of injury (x^2=24.15, p=0.007) significantly predicted RTW outcomes at 6 weeks, while previous concussions did not (x^2=4.59, p=0.10). Notably, females were more likely to return to work at a reduced capacity than a full RTW (β=12.1, SE=5.48, p=0.027). Pre-injury occupations of females with a partial RTW at 6 weeks included education (37.5%), business (25.0%), medical (12.5%), and social service (12.5%).

Conclusions: Age, sex, pre-injury occupation, and mechanism of injury were significant predictors of RTW at 6 weeks post-concussion. Understanding these predictors can help guide personalized post-concussion management and support for individuals struggling to resume work fully.

584 Prevalence and Patterns of Persisting Cognitive Impairments at 6 Months Post-Injury in a Canadian Sample: Comparison to TRACK TBI

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ABSTRACT

Objectives: Cognitive impairment is a common sequelae of moderate to severe traumatic brain injury (msTBI). The degree of persistence of cognitive impairment following msTBI, and the domains of cognitive function in which individuals continue to experience dysfunction, remain less clearly understood. A recent study utilizing the TRACK TBI dataset, a longitudinal, multisite, American study, identified that approximately 50% continue to experience cognitive deficits at 6 months following msTBI, and that there were diverse profiles of impairment, with the majority showing impairment to processing speed only. It is unclear how closely Canadian and American samples align. The present study was undertaken to examine the persistence and profiles of cognitive impairment in a large Canadian sample following msTBI.

Methods: The current study was a secondary analysis of n=197 patients with msTBI drawn from the Toronto Rehab TBI Recovery Study cohort, a multimodal longitudinal Canadian study comparable in assessment methods to TRACK TBI, including a cognitive assessment at approximately six months post-injury. A battery of standardized, performance-based neuropsychological tests assessed multiple cognitive domains, including memory, executive functioning (EF), and processing speed. Estimates of premorbid function were obtained using word-reading tests. Participants were assessed for impairment in each domain of cognitive functioning, operationalized as performance 1.5 standard deviations below the mean as per the TRACK TBI study. Following TRACK TBI, patients were classified into eight distinct impairment profiles: no cognitive impairment; memory impairment alone; processing speed impairment alone; EF impairment alone; memory and processing speed impairment; memory and EF impairment; processing speed and EF impairment; or impairment in all domains.

Results: Complete datasets were available for n=163 patients (mean age = 39.5, 75.5% percent male). In preliminary analyses, 30.1% of the sample demonstrated no evidence of cognitive impairment at approximately six months post-injury. Amongst the ~70% exhibiting persisting cognitive impairment, diverse cognitive profiles were observed, with impairment in memory and processing speed emerging as the most common profile (17.2%), followed by impairment in memory alone (16.0%).

Conclusions: With a prevalence of 70% impairment at roughly 6 months post-injury, 20% percent more individuals in this Canadian sample demonstrated persisting impairments on at least one cognitive outcome measure at 6 months post-injury as compared to the TRACK TBI study. The most prevalent profile of impairment was memory and processing speed, with a greater likelihood of memory impairment relative to isolated processing speed deficits. This stands in contrast to TRACK TBI, where patients showed isolated processing speed deficits as the most common profile. The paper will discuss possible explanations for the substantive differences between these Canadian and American cohorts.

585 Tackling Tradition: Exploring the Sociocultural Context of Concussion Prevention in Canadian Youth Rugby

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ABSTRACT

Canadian youth rugby participation is growing and with it comes an increased risk of injuries, like concussion. Appropriately targeted prevention strategies are essential for mitigating concussion risk while promoting the health benefits of sport. Evidenced-based primary prevention strategies are available, including policy/rule changes, equipment recommendations, and training interventions. However, research suggests that such prevention strategies are variably implemented, thus limiting their impact. Examining these strategies through a sociocultural lens could provide a clearer understanding of their inconsistent implementation. Sociocultural contexts have been examined with respect to secondary (i.e., management) and tertiary (i.e., rehabilitation) prevention, but there is limited evidence that considers how sociocultural constructs influence primary prevention.

Purpose: 1) To understand how sociocultural factors influence the implementation of primary concussion prevention, and 2) understand the unique influences of the Canadian rugby context on primary concussion prevention strategies.

Methods: This project was guided by sociocultural theoretical frameworks on sport, pain and injury, and more specifically the culture of risk, masculinity, and sportsnet. We conducted semi-structured interviews (N = 6) with national and provincial rugby administrators (e.g., presidents, executive directors) and focus groups (N = 2) with provincial youth club rugby coaches across Canada (i.e., Alberta, British Columbia, Ontario). We analyzed the data using codebook thematic analysis grounded in critical realism.

Results: Four higher order themes were generated from administrators' and coaches' descriptions of concussion prevention in the rugby context. First, Contact for Injury Prevention emphasizes how rugby stakeholders embrace their sport's risky nature in a more nuanced way then traditional conceptualizations of the culture of risk. Specifically, rather than a "put the body (head) on the line" attitude, stakeholders believe in preparing for the collisional nature through prevention strategies. Out with the Old. . .In with the New highlights how the Canadian rugby culture has begun to accept concussion initiatives and assigned concussion with an exceptional status in comparison to other musculoskeletal injuries, shifting from an old school approach (e.g., tough it out) to a newer, safer, mentality. Nothing About Us Without Us contradicts traditional conceptualizations of 'sportsnets' as authoritarian and emphasizes that to implement changes related to concussion prevention, an integrated approach that facilitates transmission of top-down evidence while incorporating knowledge-user perspectives is seen as essential. Lastly, Evolving Initiatives demonstrates participants' acceptance of mandatory primary prevention programs like concussion education, but highlights that these strategies must be aligned to meet the demands (e.g., time, human resource, overload fatigue) on youth sport administrators and coaches.

Conclusions: Our results suggest a deviation from previous sociocultural evaluations of rugby that may indicate a willingness to implement prevention strategies, with partnered approaches. The findings contribute an important piece to the contextual puzzle that can assist researchers and policymakers in designing future youth sport concussion prevention strategies.

586 Identifying Predictors of Acute Sport-Related mTBI Using Similarity-Driven Multi-View Linear Reconstruction of Multimodal Neuroimaging Data

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ABSTRACT

Biomarkers that support the diagnosis and prognosis of mild traumatic brain injury (mTBI) remain elusive. Consequently, management decisions for mTBI patients rely heavily on subjective symptom reports and clinical assessments. Magnetic resonance imaging (MRI) offers a promising, non-invasive method for studying changes in brain structure and function following mTBI, with the potential to identify markers that could aid in diagnostic and prognostic decisions. However, studies have primarily focused on identifying group differences between participants with mTBI and controls, yielding mixed results. There is limited literature on how MRI data can be utilized to classify or cluster acute mTBI patients versus uninjured individuals, and fewer studies have explored the integration of multimodal MRI data for this purpose. In this work, we leverage similarity-driven multi-view linear reconstruction (SiMLR) to explore how multimodal MRI datasets can advance our understanding of acute mTBI. Fifteen adolescent males (15-18 years) with acute sport-related mTBI (< 2 weeks post-injury) and 27 age- and sex-matched healthy collision sport athletes served as a comparison group. Participants underwent 3T T1-weighted, diffusion-weighted, and resting-state functional MRI scans, as each of these modalities show promise in identifying subtle features of mTBI. Diagnosis of mTBI was made by an experienced physician. Imaging-derived quantitative metrics were computed with ANTsPyMM v1.4.0, utilizing standard atlas-based anatomical and functional imaging postprocessing pipelines within the ANTsX ecosystem. This produced a matrix of over 17,000 quantitative neuroimaging metrics, including anatomically constrained cortical measurements, white matter microstructure, and functional connectivity for each participant. SiMLR was then applied to these matrices using ANTsR v0.6.1 with default settings to identify low-dimensional embeddings that optimize the joint predictive power across the three MRI modalities while controlling for age. Generalized linear models were used to explore the importance of each low-dimensional embedding in relation to group membership (acute mTBI versus control) using 1000 permutations and $p < 0.05$. Effect sizes were calculated for embeddings that were significant predictors of group membership. This process identified three low-dimensional embeddings that were moderate-strong predictors (d's 0.64-0.83) of group membership. Two embeddings were derived from diffusion-weighted metrics with the third based on contributions from resting-state measures. An advantage of SiMLR is the preservation of interpretability enabling identification of features that contribute most to the joint embedding space. Using this feature, asymmetry in mean fractional anisotropy within the cingulum and anterior corona radiata, along with connectivity between the

temporoparietal and executive control networks, were identified as the strongest contributors to the joint space for each significant embedding. Future directions include further optimization of SiMLR on a larger dataset and integration of additional MRI modalities such as FLAIR and perfusion imaging. Additionally, future work will explore how SiMLR features may be used to understand longitudinal symptom burden and recovery outcomes.

587 On the Ropes: Examining Concussion Risk in Youth Boxing at the Canada Winter Games

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ABSTRACT

Background: Boxing has been an event in the Canada Winter Games since 1971, providing a platform for young athletes to showcase their skills. However, due to decreasing popularity of the sport as well as concerns over safety, it was removed from the 2015 Games. Youth participation in boxing has been controversial, as it requires balancing the benefits of participation in boxing programs with the potential risks posed by a sport involving repetitive head impacts. Understanding injury risks is an important first step for informing future decisions about boxing's role in the Games and ensuring the safety of all youth athletes involved.

Purpose: To examine concussion incidence, rates, and mechanisms for athletes participating in boxing at the Canada Games.

Methods: This retrospective cohort study examined registration data and medical reports from the 2011 and 2019 Canada Winter Games. New and subsequent injuries, directly and indirectly related to boxing participation, were coded in alignment with the 2020 International Olympic Committee consensus statement on methods for recording and reporting epidemiological data on injury and illness in sport. Incidence rates (injuries per 1000 athlete-days) and clinical incidence (injuries per 100 athletes) with 95% confidence intervals (CI) were calculated for the two Games.

Resutls: In total, 108 males (67 in 2011, 41 in 2019) [mean age (range): 17.0 (15.2-18.1)] participated in 3-day or 4-day events, with a total of 387 athlete-days across the two Games. Of these athletes, 47 sustained at least one injury, with a total of 51 injuries directly related to participation. There were eight head injuries directly related to participation across the two Games; five of which were concussions. In 2011, three concussions were reported [13.1 concussions per 1000 athlete-days (95% CI 3.5-48.6)] followed by two in 2019 [12.6 concussions per 1000 athlete-days (95% CI 3.8-42.1)], all resulting from direct contact with another athlete. The clinical incidence of concussion in both 2011 and 2019 were similar [4.5 concussions (95% CI 0.9-13.1); 4.9 concussions (95% CI 0.6-17.6) per 100 athletes, respectively]. Of athletes who sustained a concussion, one athlete reported having a previous concussion within 1-year of participating in the Games.

Conclusions: Approximately 1 in every 20 youth boxers were estimated to sustain a concussion at the Canada Games. The clinical incidence of concussion in boxing at the 2011 (4.5%) and 2019 (4.9%) Canada Games is higher than previous reports of concussion in Olympic boxing events which ranged between 0 to 3.2%. Despite increased concussion awareness and improved concussion recognition tools, concussion rates remained consistent between both Games. These findings highlight an important starting point for future studies examining concussion prevention strategies. Continuing to explore injury rates and mechanisms at the Games are an important step to help protect young athletes.

588 Clinician Perspectives on Screening and Managing Intimate Partner Violence-Related Traumatic Brain Injury in the Clinical Setting: A Mixed Methods Content Analysis

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ABSTRACT

Background: Intimate partner violence (IPV) related traumatic brain injury (TBI) is understudied, and no standard of care exists in the United States to simultaneously screen and document for the two overlapping conditions in the clinical setting leading to wide heterogeneity in prevalence estimates and care approaches. The objective for this study was to survey clinicians in the emergency, trauma, and rehabilitation clinical settings to determine challenges, facilitators, and recommendations for screening and managing IPV-related TBI.

Method: This study utilized a mixed methods approach using a cross-sectional online survey distributed among licensed clinicians with direct patient care and who were employed in emergency, trauma, and rehabilitation hospital settings in the United States. The survey was distributed via email to national listserv subscribers (Traumatic Brain Injury Model Systems, the Trauma Center Association of America, and the American Congress of Rehabilitation Medicine) and via snowball sampling. The main outcome measures included a 12-item Likert survey to determine clinician beliefs with screening and managing IPV-related TBI and 4 open-ended text questions designed to identify challenges, facilitators and recommendations for screening and managing IPV-related TBI. Descriptive statistics described respondents and Likert scale responses, and an inductive qualitative content analysis was conducted to prepare, organize, and report text data from the open-ended questions.

Results: Respondents (n=60) were 42.8 ± 10.9 years old, White (83%), Non-Hispanic (93%), female (73%), and

primarily physicians (38%) or nurses (42%) within the emergency (52%), trauma (52%), and rehabilitation (30%) settings. The majority (73%) agreed that IPV-related TBI was difficult to diagnose, disagreed that family members accurately relayed cause of injury (77%), disagreed they received training/education on identification (63%) or treatment (67%) approaches, and were not aware of organizational (53%) or state/federal policies (48%) for the overlapping conditions. Content analysis of the open-ended questions generated three primary themes: "Education and Training," "Clinical Practice," and "Policies and Resources." Clinicians lacked education and awareness of IPV-related TBI (e.g., knowledge of injuries, policies, or resources), identified challenges with identification and treatment (e.g., time constraints, lack of clinical experience, ensuring safety, and patients' hesitancy to disclose circumstances surrounding their injury), noted limited to no organizational, state, or federal policies to guide screening, documentation, and treatment, and described variability in resources to give to patients.

Conclusions: Standardizing education and training across clinical disciplines and specialties may improve the uptake of routine care practices and the accuracy of prevalence estimates which could ultimately justify resource allocation. Future research is warranted to clarify stakeholders' perceptions using interviewing techniques and to determine the root causes of challenges to identify systematic solutions to this multifaceted problem.

590 Equitable Concussion Monitoring: Exploring a Generalizable Model for High School Athletics

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ABSTRACT

Background: Adolescent sport-related concussion (SRC) is a serious public health problem in contact sports. In general, systematic reporting is not required, reflected by limited infrastructure and support for reporting. Major gaps exist in understanding adolescent SRC epidemiology. Regional and nationwide monitoring programs are of interest, but financial and practical aspects are not well understood.

Methods: Local, regional, and state-wide high school SRC monitoring programs and nationwide research were identified to determine cost and other practical aspects, and potential barriers to implementation. Resources included 1) State Education department websites, 2) Compiled lists of state-level laws and implemented programs (through Centers for Disease Control and Prevention as well as the Brain Injury Association of New York State), and 3) programs highlighted through professional networks. Costs were determined through 1) the above, 2) projections of athlete volume in The National Federation of State High School Associations, and 3) publicly available program- and state-level fiscal end-of-year program financial documents. Cost estimates included physicians, data managers, systems fees, and educational resources. Athletic trainer support varied across models. State- and athlete- level costs modeled a program in New York with 341,454 athletes.

Results: Publicly available data were reviewed, and semi-structured interviews were conducted with program coordinators at regional (a rural New York high school district), state (Hawaii Concussion Awareness Management Program (HCAMP) and North Texas Concussion Registry (ConTex) programs) and national (High School Reporting Information Online (RIO)) levels. Infrastructure varied from volunteer-based to state-funded mandatory programs. Support ranged from state support enhanced by traffic violation surcharges to philanthropic or volunteer resources. State-level cost estimates for New York State ranged from $677,635.2 to $37.7M, with per athlete costs of $1.98 (national model) to $110.54 (local model). Logistic challenges, including medical personnel and data infrastructure, appeared manageable at scale in each model.

Conclusion: High school SRC monitoring programs are feasible and often cheaper than routine costs associated with sports participation (e.g. uniforms and standard equipment). These models provide guidance for possible implementation of state- and federal-level programs. Large, inclusive programs are necessary to identify critically understudied aspects of SRC including health disparities as relates to SRC detection, reporting, and recovery in diverse populations.

591 Electroencephalography Markers of Brain Function in Post COVID-19 Condition

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ABSTRACT

Even though COVID-19 is primarily a respiratory illness, it can affect more than 10 physiological systems, with over 200 reported symptoms. Around 30% of individuals infected with COVID-19 experience symptoms persisting beyond 12 weeks post-infection, known as Post COVID-19 condition (PCC). The 3 main symptoms of PCC 6 months post-infection include fatigue, brain fog, and post-exertional malaise. PCC has been associated with changes in the blood-brain barrier, grey matter loss, and decreased brain excitability. These brain changes may underlie the residual and persisting symptomatology of PCC.

This study aimed to identify the electrophysiological correlates associated with the main lingering symptoms of PCC. We used electroencephalography (EEG) data captured with a 64-channel cap (Brain Products, Germany) to explore the changes in brain oscillatory and functional properties during rest and hand movements in 20 PCC participants (43±10 yo; 14 females; 24±11 months post-infection) and age- and sex-matched controls. Mean post-movement beta rebound (PMBR), measured as percent change in beta power relative

to baseline, was found to be significantly lower in the PCC group (3.8% ± 18.1%) over the sensorimotor area (electrode C3, p= 0.039) compared to the control group (18.5% ± 21.7%), as determined by an independent samples t-test. Additionally, the aperiodic exponent of the power spectral density measured at rest was significantly elevated in PCC within slow frequencies (2-7 hz), specifically at the parietal lobe electrodes Pz (p= 0.011) and CPz (p= 0.034). The mean values for the Pz electrode were = 0.85 ± .5 for the PCC and 0.46 ± 0.35, for the control group, while for CPz, they were 0.89 ± .054 for the PCC and 0.53 ± 0.3 for the control group, also determined by independent sample t-tests. Pearson correlation analyses showed that higher PMBR values were associated with lower Cognitive Failure Questionnaire scores (r= -0.36, p= .03). Additionally, aperiodic exponents were associated with fatigue severity scale (FSS) (r= 0.41, p= 0.013). Reduced PMBRs observed in PCC suggest impaired sensorimotor control, affecting motor inhibition and learning. Elevated aperiodic exponents over the parietal and central regions suggest increased neuronal inhibition in sensory and motor processing areas. The associations between specific EEG features and clinical scores underscore their value as potential biomarkers for the symptomatology present in PCC.

These results represent a critical step toward developing diagnostic methods and targeted treatments to alleviate the debilitating symptoms experienced by this population.

592 The Impact of Caregiver Peer Support for Informal Caregivers of Individuals with Moderate to Severe Traumatic Brain Injury: A Scoping Review

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ABSTRACT

Introduction: Individuals who have sustained a moderate to severe traumatic brain injury (TBI) may experience long-lasting challenges that requires informal caregiving from their families. Caregivers often experience high burden due to the substantial life changes that result from the requirements and demands of the caregiver role. Notably, caregivers of individuals with moderate to severe TBI have emphasized their need for emotional rather than practical support. Caregiver peer support is an effective approach to address the emotional needs of caregivers of individuals with other neurological conditions. However, there is limited research on the impact of peer support for caregivers of individuals with moderate to severe TBI.

Objectives: To understand the impact of peer support for informal caregivers of individuals with moderate to severe TBI.

Method: This scoping review was conducted in line with Arksey and O'Malley's framework. The following five stages of this framework were applied: determining the research question, identifying and then selecting relevant studies, mapping the data, and presenting the results. Studies were included if participants of any relational role were adult caregivers of an adult with a moderate to severe TBI, if the intervention entailed peer support from caregivers with lived experience, and if the impact of peer support on caregivers was described. Systematic or scoping reviews, conference abstracts, and unpublished peer-reviewed works such as dissertations were excluded. Searches were conducted on four electronic databases (MEDLINE, CINAHL, EMBASE, PsycINFO), and studies were independently screened for eligibility by two researchers during two stages of review (title and abstract, full-text). Conflicts were resolved through discussions between the two reviewers.

Results: There were 1860 studies that were screened. Of these, 29 were identified for full-text screening, with a total of five studies being included in the review. These five studies had heterogeneous study designs (e.g., randomized controlled trial, pre-post intervention, qualitative). Most caregivers were females, and had relational roles of spouses/significant others or parents of the individual with TBI. Interventions were delivered at rehabilitation hospitals or online, and were a mixture of in-person or online support groups; only one intervention was a one-to-one peer mentoring program. Caregivers reported high burden in areas of personal growth (especially when comparing themselves to their friends), time (including time for self-care), social roles, and emotional and physical support. Overall, caregiver peer support interventions provided emotional support for caregivers of individuals with moderate to severe injuries, however interventions did not demonstrate impact in other areas of burden (e.g., mental health, coping).

Conclusion: Findings demonstrate the impact of caregiver peer support, with potentially enhanced benefit when combined with another intervention to further reduce areas of burden associated with the caregiving role.

593 Relationships between Healthcare Utilization Preferences and Hypothetical Rehabilitation Treatment Decisions: Implications for Patient Education

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ABSTRACT

Traumatic brain injury (TBI) can result in long-term sequelae, even years after injury. In other chronic disabling conditions, pursuit of complementary and alternative medicine (CAM) is common, as patients pursue treatment options for persistent symptoms that interventions within the traditional medical system have not fully resolved. Preliminary studies investigating CAM adoption in adults with TBI suggest that

a substantial proportion of patients pursue at least some CAM in addition to traditional rehabilitation. Here, we investigate how individual differences in healthcare utilization preferences relate to a person's willingness to pursue various rehabilitation treatment options. In the healthcare decision-making literature, individual differences in healthcare utilization preferences are predictive of both hypothetical and real-world treatment decisions. We define healthcare utilization preference as a person's preference for pursuing more versus less healthcare. The Medical Maximizing-Minimizing Scale is a valid and reliable individual difference measure for assessing healthcare utilization preference. As measured by the MMS, medical "Maximizers" prefer to receive more health care (e.g. more medical testing, more aggressive treatment) while medical "Minimizers" tend to prefer to receive less health care. In the current study, we test whether Maximizing and Minimizing preferences as measured by the MMS predict treatment preferences in the general population for rehabilitation options across two conditions: evidence-based (EB; operationally defined as those recommended by INCOG with Level A evidence) and non-evidence-based (non-EB; real-world interventions that are either untested or are not currently recommended by INCOG). We will also conduct exploratory analyses to determine whether a history of head injury impacts these hypothetical treatment decisions. METHODS: Participants completed a treatment decision-making task, in which they rated their willingness to pursue various EB and non-EB interventions for TBI-related cognitive impairments. Following this decision-making task, participants completed the MMS scale, which was used to characterize their healthcare utilization preferences (Minimizer vs. Maximizer). Participants answered several questions soliciting their prior history of head injury/concussion/TBI. Participants also completed several additional scales that serve as control variables (health risk tolerance, health status, demographic factors). Stimulus items for EB cognitive interventions recommended by INCOG were modified from treatment descriptions drawn from textbooks and primary journal articles. Stimulus items for non-EB cognitive interventions were modified from treatment descriptions drawn from patient-facing, real-world CAM clinic websites. RESULTS: 276 individuals enrolled in the study, ranging in age from 18 to 87 (M = 52, SD = 17). A substantial proportion (44%) of participants endorsed a history of head injury (TBI/concussion). Analyses of the treatment decision-making data are underway and will be completed by the time of the conference. This study represents the first step in a line of work that will characterize heterogeneity in patient preferences related to healthcare utilization in service of better tailoring patient education to individual clients.

594 A Blinded Prospective Comparison of Zeroing Methods for External Ventricular Drain (EVD) Transducers

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ABSTRACT

Introduction: In neurosurgical ICUs, external ventriculostomy drain (EVD) transducers are zeroed using one of two methods: an "open" method, which requires removal of the non-vented cap from the transducer or a "closed" method which involves lowering the buretrol to zero. While the closed method has the advantage of maintaining a closed, sterile system, it goes against manufacturer guidelines and may compromise accuracy.

Objective: To directly compare the accuracy of each zeroing method and to assess whether any differences in accuracy are consistent across different brands of EVD collection systems.

Methods: This was a blinded, prospective bench study. An EVD collection system (Integra or Natus brand) was connected to a saline bag. The height of the saline bag was changed to generate pressures from 5-30 mmHg which were confirmed by a manometer connected in series (ground truth). One examiner zeroed the transducer (Edwards Lifesciences TruWave Arterial Line Transducer) using one of the methods dictated by a random number generator. Another examiner, blinded to both the zeroing method and manometer level, then recorded the pressure from the monitor. Paired T-tests then compared the accuracies of each zeroing method and each EVD brand.

Results: 612 data points were collected across two brands of EVD collecting systems paired with separate Edwards Lifesciences brand transducers. Mean differences from ground truth for all open and closed method trials, including both brands, were 0.66 and 0.31 mmHg respectively ($p<0.0001$). Successful trials, defined as accurate within 1 mmHg of ground truth, were 88% and 99% respectively. Additionally, mean differences from ground truth between open and closed method trials using the Integra brand collecting system ($n=408$) were 0.55 and 0.29 mmHg ($p<0.0001$) with success rates of 85.5% and 99% respectively while mean differences from ground truth between open and closed method trials using the Natus brand collecting system ($n=204$) were 0.86 and 0.35 mmHg ($p<0.0001$) with success rates of 94% and 99% respectively.

Conclusions: While the transducer manufacturer recommends opening the cap for zeroing, here we demonstrate that (1) EVD systems can be zeroed more accurately without opening the system to air and that (2) this finding is consistent across two different brands of collection systems. Finally (3) while both methods appear to be highly accurate, the closed method may have the added benefit of minimizing the risk of contamination during zeroing.

595 Examining Progress for Patients with Disorders of Consciousness Using the Minimal Detectable Change for the Coma Recovery Scale-Revised

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ABSTRACT

Background: The Coma Recovery Scale-Revised (CRS-R) is a widely used assessment for patients with disorders of consciousness (DoC). The rating scale categories on the CRS-R have been aligned to each state of consciousness to diagnose patients to either the unresponsive wakefulness syndrome, minimally conscious state minus, minimally conscious state plus, or emerged from the minimally conscious state. The CRS-R also provided an ordinal total raw score that ranged from 0 to 23. However, an ordinal score only indicates the direction of change between two assessments (i.e., improvement or decline). Prior work used the Rasch Measurement Model to transform the CRS-R's ordinal, total raw score that ranges from 0 to 23 to an equal interval 0 to 100 Rasch measure. The transformed measure enables the ability to evaluate the direction and magnitude of change between two assessments.

Objectives: To evaluate change during rehabilitation for patients with DoC after severe brain injury.

Methods: We conducted a secondary analysis of data from two DoC programs. The CRS-R was conducted at baseline (i.e., admission to rehabilitation) and week 4. We applied a previously published minimal detectable change value with a 95% confidence interval (11 units) to the CRS-R change measure to determine whether participants improved or declined beyond measurement error.

Results: 323 patients with DoC had a baseline and four-week CRS-R record. The mean days post-injury at baseline were 49 (SD: 47 days). The mean age at admission to rehabilitation was 47 years (SD: 20 years). 135 (42%) patients with DoC were male, 214 (66%) were white, and 165 (51%) had a traumatic injury. 37% of patients (119/323) improved beyond measurement error and 5% of patients (17/323) declined beyond measurement error. Patients who declined or had no change beyond measurement error (n=145) had a baseline CRS-R administered an average of 53 days post-injury (SD: 32 days). Patients who improved beyond measurement error (n=91) had a baseline CRS-R administered an average of 45 days post-injury (SD: 17).

Conclusions: Patients who were admitted to post-acute care rehabilitation earlier may be a proxy for those who had fewer complications or co-occurring conditions. Identifying patients who have improved indicates the current treatment is having a positive impact. Whereas patients who are declining beyond measurement error may require additional days in rehabilitation to progress and additional evaluations to rule out co-occurring conditions such as hydrocephalus or subclinical seizures. Incorporating the minimal detectable change into clinical practice may support data-driven treatment decisions.

596 Expected Outcomes of Traumatic Brain Injury Rehabilitation: Insights and Perspectives from Care Partners

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ABSTRACT

Choosing appropriate outcome measures is a critical step in assessing the efficacy of treatments in intervention research and in measuring clinical progress. In some cases, frequently utilized outcome measurement tools do not adequately capture domains in which key stakeholders are expecting to see improvement. Mismatches between what is measured in research and in the clinic, and what stakeholders expect to improve following rehabilitation can lead to reduced overall satisfaction and trust in the healthcare system. As part of a larger study, we sought to characterize what outcomes matter most to key stakeholders in traumatic brain injury (TBI) rehabilitation. In this presentation we present data elicited from care partners of people with a history of moderate-severe TBI. Fifty-one care partners in the United States completed a two-part survey which included 1) questions to characterize each care partner's relationship to an individual with moderate-severe TBI and to describe the extent of their caregiving involvement following their loved one's injury and 2) open-ended questions that were specifically designed to elicit measurable rehabilitation outcome domains. Open-ended responses will be analyzed with qualitative thematic analysis. Twenty-two of the fifty-one care partners (43%) identified as a spouse or significant other of an individual with moderate-severe TBI, followed by a relative (35%), close friend (6%), or child (6%). Thematic analysis of the open-ended responses is ongoing. In a first round of thematic coding, initial codes have been generated. We expect to have organized these initial codes into themes and sub-themes by the time of the conference. Preliminary results from the first round of coding suggest that a large proportion (> 70%) of caregivers expected to see improvements in physical ability, memory, and overall communication. In addition, two thirds of care partners endorsed emotional challenges that they hoped to see improvement on during TBI rehabilitation. Finally, an overall sentiment shared by more than eighty percent of care partners was an expectation or wish for their loved one to 'return to baseline', which included comparisons to their life before or a reference to "normal". Care partners bring a unique perspective on what matters most after brain injury. Future work will synthesize the perspectives of multiple stakeholder groups to inform the development of new outcome measures in TBI rehabilitation.

598 Falling On Deaf Brain: Cortical Deafness After MCA Infarction

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ABSTRACT

A 41 year old female with a past history of heart failure and left MCA stroke with residual aphasia presented to an acute care hospital with altered consciousness and left sided weakness. Imaging revealed a right MCA M1 occlusion. After thrombolytic therapy she underwent a mechanical thrombectomy with TICI 2b reperfusion. Three days later, she developed postoperative malignant cerebral edema requiring emergent decompressive hemicraniectomy. She was subsequently transferred to a long-term acute care hospital, followed by inpatient rehabilitation hospitalization three weeks after initial stroke onset. Upon admission to the rehabilitation hospital, she was unable to understand spoken words, though her ability to communicate through written language remained intact. Additionally, she presented with left hemiparesis and impulsivity. Audiometry was performed due to concerns of primary hearing loss, revealing no response to sound up to 120 dB despite normal otoacoustic emissions, suggestive of a central cause of her hearing impairment. Communication via written language with a computer tablet continued throughout admission. Reevaluation of hearing function about one month later revealed significant improvement in hearing. The patient was discharged home with a sound amplifier to use as needed. DISCUSSION: Central hearing impairment after stroke is rare but is most commonly observed in cases with bilateral lesions interrupting the ascending auditory pathways in the temporal lobes or subcortical regions. Deficits usually include speech comprehension, spontaneous speech, and hearing sensitivity while reading comprehension and spontaneous writing remain intact. In patients with impulsivity and difficulty communicating post-stroke, culprits such as aphasia, anosognosia and apraxia are typically suspected. However in patients with bilateral lesions, central hearing impairment should be considered.

600 Priorities for Clinical Practice and Research on Overdose-Induced Hypoxic Brain Injury

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ABSTRACT

Background: Overdose-induced hypoxic brain injury is a devastating yet understudied consequence of the global toxic drug crisis. Non-fatal opioid poisoning triggers respiratory depression, reducing cerebral blood flow and causing irreversible neuronal damage, leaving survivors with long-term disability. Previous research raises two key questions: How do we recognize overdose-induced brain injury, and how do we best support those affected? Given the lack of evidence, stakeholder guidance is needed to produce actionable insights with practical utility for knowledge-end users. Therefore, this mixed-methods study engaged stakeholders in a workshop to generate priorities for research and clinical practice on recognizing and responding to overdose-induced hypoxic brain injury.

Methods: Data were collected during a one-day (6-hour) workshop. Participants were 14 stakeholders in the brain injury and substance use communities (Mean age = 46.14 years, SD = ±14.59 years, 57% female), including people with lived experience of brain injury (n = 6) and/or overdose (n = 3), family members of people with lived experience of brain injury (n = 4) and/or overdose (n = 4), service providers (n = 2), government representatives (n = 4) and healthcare professionals (e.g., RNs, R.Psychs., n = 6). Individuals could identify with more than one stakeholder group. Using the World Café method, stakeholders participated in small group discussions (3–5 participants per group) over two sessions (i.e., generation, prioritization). Discussions led to the generation of over 50 ideas, which were then collated, themed and rank-ordered by priority (urgency, impact, feasibility) through group voting. All quantitative analyses were conducted using R (version 4.3.3).

Results: Stakeholders' discussions and subsequent prioritization evaluations identified 18 priorities for research on recognising (e.g., what barriers currently exist for training clinicians to recognize overdose-induced brain injury?) and responding (e.g., what are the most evidence-based and cost-effective treatment modalities?) to overdose-induced brain injury. Similarly, 14 clinical practice priorities were identified across the recognition (e.g., standardizing discharge diagnoses) and response (e.g., developing evidence-based guidelines for acute care) domains. Ideas were organized and rank-ordered by stakeholders' priority evaluations in each domain, for both research and clinical practice. The full list of priorities touches on a wide array of tools (e.g., screening and diagnostic measures), technologies (e.g., electronic medical records) and approaches (e.g., trauma-informed services), spanning across the acute to long-term stages of care.

Conclusions: This study identified community-driven priorities for recognizing and responding to overdose-induced hypoxic brain injury. These findings serve as a source of knowledge where there currently is none, providing insight into stakeholders' priorities for research and clinical practice. Healthcare professionals, researchers and funding agencies should use these priorities to inform their agendas and address stakeholders' most urgent needs, fostering meaningful improvements to the current state of empirical knowledge and clinical care.

601 Determining the Effects of a Positive Toxicology Screen for Amphetamines or Cocaine on Functional Gains during Inpatient Rehabilitation: A Study of Patients with TBI and a History of Illicit Drug Use Receiving Neurostimulants as Part of Clinical Care

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ABSTRACT

Objectives: To examine functional gains during inpatient rehabilitation for individuals with a pre-injury history of illicit drug use who were receiving neurostimulants as part of their clinical care, focusing on differences between those with and without a positive drug screen for cocaine or amphetamines upon hospital admission.

Methods: Retrospective cohort study including patients with TBI between 2006 and 2023 at an inpatient rehabilitation facility. All patients were enrolled in the TBI Model System (TBIMS) National Database. Based on information in the TBIMS database, patients reporting history of illicit drug use were selected for retrospective chart review to determine toxicology screening results and medications administered during rehabilitation stay. Charts were reviewed for 191 patients. After excluding those with interruptions in rehabilitation stay or length of stay (LOS) outliers (greater than 2 standard deviations above the mean), patients were divided into groups regarding neurostimulant administration. A total of 147 patients received neurostimulants and 25 did not. The group receiving neurostimulants was further divided based on admission toxicology screen results for amphetamines and/or cocaine. A total of 46 patients were positive for amphetamines/cocaine and 101 patients were negative. The primary outcome of this study was the FIM(TM), a standardized tool used to assess levels of disability and function during and following rehabilitation. FIM scores can be divided into motor and cognitive subcategories. To account for variation in rehabilitation LOS, a FIM Efficiency score can be calculated (FIM discharge score subtracted by FIM admission score, divided by rehabilitation LOS). Covariates included in data analysis were: length of post traumatic amnesia (PTA), age at injury, alcohol use, acute care LOS, education level, and sedative administration during rehabilitation.

Results: A significant difference (p=0.031) between those with and without positive amphetamine/cocaine screens was found for Total FIM Efficiency, even after controlling for the effects of covariates (M=3.30, SD=1.66 and M=2.47, SD=1.61 for negative and positive screens, respectively). A similar finding (p=0.013) was noted for FIM Motor Efficiency (M=2.54, SD=1.33 and M=1.86, SD=1.26 for negative and positive screens, respectively). No significant difference (p=0.51) was found between groups for FIM Cognitive Efficiency. Significant covariates in the models included acute care LOS for Total FIM and FIM Motor Efficiency and Length of PTA for FIM Cognitive Efficiency. Those with positive toxicology screens had longer acute stays and PTA compared with those with negative screens.

Conclusions: The prescription of neurostimulants for patients with a pre-injury history of drug use is common in brain injury rehabilitation. Regardless of toxicology results, patients showed positive functional gains during inpatient rehabilitation. However, those in the positive toxicology group made gains in a less efficient manner than those in the negative group. Admission toxicology reports can provide useful information to providers in planning rehabilitative care.

602 Repetitive Head Impacts in Youth Soccer: Cognitive Decline Within a Single Soccer Season

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ABSTRACT

Background: Repetitive head impacts have long-lasting negative effects on the cognition of athletes. For example, repetitive head impacts accumulated by adult professional soccer players throughout their careers result in long-term negative consequences on cognition. However, the effects of one season of play on youth soccer players are not known.

Purpose: The purpose of this study was to quantify head impact exposure in youth elite soccer and to examine the effects of repetitive head impacts on the cognitive function of youth male soccer players.

Methods: A prospective cohort study of a single boys' soccer team of 18 players was completed throughout a single soccer season. Head impact frequency data were recorded and video-verified using impact monitoring mouthguards worn during practices and games. Cognitive function was assessed using cognitive-motor integration tasks conducted before the first season game, every subsequent four weeks, and after the last game of the season. The cognitive motor integration task outcome measures included peak path velocity, absolute error, reaction time, full path movement time, and the number of direction reversals.

Results: Over a single soccer season, a total of 1089 head impacts occurred. More head impacts were experienced in practices (n = 683, 62.7%) than in games (n = 406, 37.3%). Midfielders experienced the most head impacts during practices (n = 366, 53.6% of practice impacts), and defenders experienced the most head impacts during games (n = 194, 47.8% of game impacts). Repetitive head impact exposure by position was associated with significant decreases in absolute error of 0.55 mm in defenders (4.92% decrease from baseline, 95% CI [-0.93, 4.9x10-3 mm], p<0.001), peak velocity of 0.46 mm/s in forwards (12.3% decrease from baseline, 95% CI [-0.69, -0.19 mm/s], p<0.001), and a significant increase in reaction time in defenders of 7.03 ms (50.0% increase from baseline, 95% CI [3.30, 9.8 ms] p<0.001).

Significance: Repetitive head impacts within a single soccer season result in a significant decrease in absolute error and peak velocity and slowing of reaction time, indicating a decline in some aspects of youth soccer players' cognitive function. Deficits in reaction time seen in a single youth soccer season are larger than those observed in other adult sports which highlights that youths may be more vulnerable than adults. Coaches should aim to reduce the number of head impacts experienced by youth soccer players, especially during practices by adjusting coaching styles and practice structure. Future work should target understanding the lasting effects of repetitive head impacts on the cognitive functioning of

youth soccer players and examine the effect sex, age, and level of competition have on repetitive head impacts and cognitive function.

603 history of Traumatic Brain Injury is Associated with Prefrontal Cortex Hyperconnectivity in Patients with Mild-Cognitive Impairment

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ABSTRACT

Objectives: Converging lines of evidence indicate that the long-term effects of moderate to severe traumatic brain injury (TBI) can mimic or accelerate the neural changes associated with pathological aging and dementia, including cortical atrophy and white matter loss. To date, however, it remains unclear how brain function is altered in response to the combined effects of the initial injury and subsequent neuropathological changes. The aim of this study is to investigate whether a history of TBI is associated with changes in functional connectivity over a 2-year period in participants with mild cognitive impairment.

Methods: A total of 79 participants with mild cognitive impairment (MCI) were drawn from the Ontario Neurodegenerative Research Initiative, including 24 with a previous history of traumatic brain injury MCI[TBI+] and 55 without MCI[TBI-]. BOLD-Resting state fMRI scans were acquired longitudinally over a 2-year period and both global and local connectivity were measured in the frontal and temporal lobes . Bayesian multilevel modelling was used to evaluate group differences in functional connectivity both cross-sectionally and longitudinally.

Results: MCI participants with prior TBI displayed greater longitudinal declines in local connectivity throughout both temporal and frontal lobes as well as frontal increases relative to MCI participants without prior TBI (Probability = 90-99%). At a global level, however, the MCI[TBI+] group demonstrated greater longitudinal increases in the prefrontal cortex and greater longitudinal decreases in global connectivity of the temporal gyri, relative to the MCI[TBI-] group.

Conclusions: Our study found evidence of greater longitudinal local and global connectivity declines in MCI participants with prior TBI, alongside a unique pattern of long-range prefrontal cortex connectivity in the MCI[TBI+] group. Overall, these findings shed light into longitudinal progression of MCI-related brain function and demonstrate that prefrontal global connectivity may be a unique feature associated with MCI[TBI+], providing further evidence that this group may be distinct, diagnostic category of interest.

604 Racial and Ethnic Differences in Traumatic Brain Injury Outcomes among Older Adults from 2009 to 2023: A Systematic Review

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ABSTRACT

Background: In 2009, Gary and colleagues conducted one of the first reviews that explored racial and ethnic differences in outcomes after traumatic brain injury (TBI). Since then, many studies have continue to find racial and ethnic disparities. However, it is unclear whether racial and ethnic differences in TBI outcomes continue to exist. Therefore, a systematic review was conducted to examine whether racial and ethnic differences in TBI outcomes exist in TBI over the last 15 years.

Methods: Relevant literature in English published from January 2009 to December 2023 was identified using the CINAHL, Gale OneFile, PsycINFO (Ovid), and PubMed electronic databases. Articles had to meet the following inclusion criteria: 1) used quantitative or mixed-method methodologies, 2) included individuals with TBI, 3) compared 2 or more racial or ethnic groups on post-TBI outcomes, and 4) included older adults. This systematic review followed PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines. Using Covidence, at least two coders independently screened abstracts and full-text articles for inclusion, and disagreements were discussed until consensus. Data were abstracted (e.g., author, title, year, design, setting, race and/or ethnicity, age, outcomes, and results), exported to Excel, and summarized.

Results: A total of 2119 studies were initially identified. After removal of duplicates, a total of 1454 abstracts were screened for inclusion or exclusion. After removal of excluded abstracts, 364 full-text articles were screened and 225 addressed racial and ethnic difference. Of those, a total of 17 articles examined racial and ethnic differences in outcomes among older adults with TBI. Most of the studies (n=17) were based on secondary data analysis. About half were experienced differences in the community, and all compared non-Hispanic white (NHW) older adults to other racial or ethnic

groups. Seven articles examined differences in discharge settings, while the remainder focused on function (cognitive, behavioral, or physical), or psychosocial outcomes. All studies but two identified racial and ethnic differences, with minoritzed racial or ethnic groups consistently reporting worse outcomes than NHW older adults.

Conclusions: This systematic review revealed that racial and ethnic differences continue to exist among older adults with TBI. Structural racism is a key driver of disparities experienced by minoritized racial and ethnic groups. Future work is needed to explore other social and structural determinants of health influencing health inequities among older adults with TBI.

605 The Characteristics of Repeated Blast Overpressure Injuries in US Special Forces Personnel

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ABSTRACT

Introduction: Recent studies suggest the cumulative effects of repeat blast exposure in military personnel may lead to premature cognitive decline and disturbance of mood, behavior and executive function. Recent studies also suggest a possible relationship to suicidal behavior in Veterans. US Special Operations Forces are a high-risk population for such injuries related to both frequent combat exposure and the use of heavy weapons systems such as heavy mortars, shoulder launched rocket systems, and breaching charges. This retrospective cohort study examines the characteristics of 100 active-duty United States Special Operations Forces members admitted to the Walter Reed National Military Medical Center's inpatient Brain Injury Medicine Unit for evaluation of cognitive impairment.

Methods: This study retrospectively analyzed medical records to gather comprehensive data on the patients' demographics, service duration, blast and impact head injury exposure. Patient characteristics were correlated with findings on brain imaging, neuropsychological testing, endocrine and biochemical measures, polysomnography, and neurological examination. The patterns of cognitive complaints and clinical findings were correlated with diagnoses, including primary and secondary TBI-related conditions and comorbidities such as PTSD, depression, and other neuropsychiatric disorders.

Results: The analysis revealed a diverse range of TBI frequency and severities, and a high prevalence of comorbid psychiatric conditions, sleep disorders, and lifestyle factors with compounding adverse effects on cognition. The pattern of impairment due to mood and sleep disorders appears distinct from that displayed with individuals with radiologically confirmed parenchymal brain injury. Mood and sleep disorders appear to be distinguished by attention deficits, variable performance and fatigue on neuropsychological testing. A majority of the cohort presented with repeated mild TBIs, often compounded by orthopedic injuries and pain syndromes, underscoring the complex clinical needs of this population.

Discussion: The findings emphasize the importance of specialized neuropsychiatric care embedded in an interdisciplinary and holistic approach in managing the sequelae of TBI among Special Operations Forces. This approach plays a pivotal role in mitigating long-term neurobehavioral consequences, enhancing recovery and force readiness. The study underscores the need for ongoing research, suggesting that a future prospective study could further elucidate the outcomes post-discharge, potentially guiding enhancements in treatment protocols and long-term support strategies for these service members.

Conclusions: The Walter Reed National Military Medical Center's Brain Injury Medicine Unit serves as an indispensable resource for Special Operations Forces suffering from cognitive and emotional disturbances to ascertain the potential contribution of TBI and other neuropsychiatric morbidities. By detailing the demographic and clinical characteristics of this cohort, this study lays the groundwork for future prospective research aimed at optimizing treatment outcomes and developing targeted interventions to support the health and operational effectiveness of these elite military personnel.

606 Comparing the Coma Recovery Scale - Revised in Children and Adults: A Rasch Analysis

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ABSTRACT

Introduction: While the Coma Recovery Scale – Revised (CRS-R) is routinely used for pediatric patients, its psychometric properties have primarily been established in adult populations. Specifically, the CRS-R is used for assessing neurobehavioral function in patients with disorders of consciousness >5 years old, while the Coma Recovery Scale-Pediatric (CRS-P) adapts this instrument for children who are <5 years old. The unidimensionality and reliability of the scale have been evaluated using the Rasch model in adults; however, this has not been replicated in the pediatric population. For this study, we combined data from both CRS-R and CRS-P to investigate preliminary evidence for the structural validity and reliability of the assessments administered to pediatric patients with disorders of consciousness. A secondary objective was to compare the hierarchy of rating scale categories generated using this study with a previously-established hierarchy for the adult population.

Methods: We conducted a retrospective analysis of data from children 1-18 years old with disorders of consciousness in inpatient rehabilitation. We used the partial credit Rasch measurement model for repeated measures.

Results: The average age of the 47 participants was 103 months (SD: 60). Each participant had >1 CRS-R/P record

for a total of 1249 CRS-R records. After randomizing first and last records to a calibration/validation sample, we used the Rasch model to generate anchored item and rating scale measures along an equal-interval scale ranging from -7.10 to 6.65 logits. Items ranged from -1.29 logits (Arousal) to 2.71 logits (Communication). All items showed acceptable model fit. Principal components analysis revealed eigenvalue 1.59. The separation and person reliability indices for the CRS-R were 2.11 and 0.85, respectively. For all items, the most difficult rating scale categories were used < 5% of all observations. 81% of all CRS-R records fit the model and mean person measure was -1.39 logits. Several rating scale categories were decidedly harder (i.e., exceeded the CRS-R/P's standard error) when comparing them with the calibrations established for adults, including a 3 on Arousal (Attention) and a 3 on Oromotor/Verbal (Intelligible Verbalization).

Conclusions: Preliminary evidence suggests that the items comprise a unidimensional hierarchy of neurobehavioral function and are sufficiently reliable for group-level decisions. Because the more challenging rating scale categories were used less frequently, they may be too difficult for young children to achieve. This is supported by the comparison with the adult hierarchy; some rating scale categories were much more difficult. However, because some categories were used fewer than 10 times in the calibration dataset, more robust analyses are necessary to determine structural validity and reliability of the CRS-R/P.

608 Comprehensive Concussion Risk Management Based on Optimal Mandible Positioning: Does Gender Matter?

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ABSTRACT

Background: Risk management of concussive blows to the head continues to be a challenge during several occupational and sports activities. Recent evidence suggests cervical muscle activation is enhanced if the lower jaw is optimized in its physiologic resting position (Streifer 2019; Garret 2023). In addition, the odds of sustaining a concussion have been shown to be 84% higher in females than in their male peers. Therefore, it is surprising that there is only limited research available to address gender responses to proper jaw alignment and concussion risk (Koerte 2020).

Purpose: Investigate cervical muscle strength and endurance response to optimal positioning of mandibular interocclusal appliance based on gender.

Methods: 42 healthy participants (20 females/22 males) ages >18 years old, were sampled by convenience. Inclusion criteria: normal cervical spine AROM, no recent head or neck trauma or surgery. Exclusion criteria: active cervical pain and any cervical spine postural abnormalities. Participants were first screened by a physical therapy orthopedic specialist to ensure normal range of motion. Then all participants were examined and custom-fitted with an interocclusal mouth appliance (IMA) to ensure optimal mandible positioning by a neuromuscular dentist. A clinical, digital pressure gauge and stop watch were used to assess neck directional strength (kg-force) and endurance (sec): 1. Flexion-strength, 2. Extension-strength, 3a. Right Side-Flexion, 3b. Left Side-Flexion, 4a. Right Side-Rotation, 4b. Left Side-Rotation, 5. Flexion-endurance, 6. Extension-endurance. Participants were tested without and then with IMA in place.

Data Analysis: SPSS was used for descriptive statistics, paired T-Tests and 2-way repeated measures ANOVA to explore differences at alpha = 0.05 with a Greenhouse-Geisser correction factor and Wilk's Lambda to test multivariate sample effects and observed power.

Results: There were 42 participants (F/M = 20/22). Average age = 26.8 (8.9) and BMI = 22.09 (9.67). There were significant differences were found in strength and endurance based on IMA Condition, ($F_{1,40}$) = 7.263, $p < 0.001$, $\eta p^2 = .154$) and Muscle Direction, ($F_{5,36}$) = 72.015, $p < 0.001$, $\eta p^2 = .643$). However, there were no significant differences due to Gender, ($F_{1,40}$) = .146, p = .710, $\eta p^2 = .003$).

Conclusions: Project results suggest significant immediate, increased neck strength and endurance responses with a customized IMA for optimized positioning compared to baseline or no appliance use. Females were overall significantly weaker than males which was not surprising. However, results did indicate both genders responded proportionately in similar to males with enhanced muscle response to conditions.

Clinical Relevance: Suggested immediate gains in cervical spine strength and endurance may assist concussion risk management for contact sports at all levels and for both genders. Results also suggest the need for further research about how proper jaw alignment might optimize neck muscle response over a broad spectrum of applications including training and competitive activities.

609 Traumatic Brain Injury and Risk Factors Associated with Post-Discharge Adverse Outcomes Following Hospitalization Among Older Adults Diagnosed With Elder Mistreatment

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ABSTRACT

Background: It is estimated that 1 in 10 people aged 60 and older experience abuse, neglect, or exploitation. With the older adult population rapidly growing, elder mistreatment (EM) is an important health and safety concern within healthcare. EM includes physical, sexual, psychological abuse, neglect, abandonment and financial exploitation. Patients who experienced EM are at an increased risk for emergency room visits, hospitalizations, and death. The consequences of traumatic brain injury (TBI) may place older adults at greater risk for EM and adverse outcomes, and EM may be an unrecognized cause of

TBI. We explored whether previous history of TBI, EM type, and hospital setting were associated with an increased risk of TBI, mortality, and unplanned hospital readmission following hospital discharge for EM.

Methods: Using 100% of 2015-2018 national Medicare files of hospitalized Medicare Fee-for-Service beneficiaries aged 66 and over, we used Kaplan-Meier and Cox proportional hazard models to estimate TBI occurrence, mortality and unplanned readmission rates by previous history of TBI, EM type, and facility type.

Results: 7,210 patients were hospitalized with an EM diagnosis between 10/01/2015 and 12/31/2018, were at least 66 years old, with Medicare coverage and no HMO coverage in the previous year, discharged after 9/30/2016, and complete death data. Of those, 7% had a previous TBI hospitalization. The majority were female (64.1%) and Non-Hispanic/ Latinx White (74.3%). Neglect was the most common EM type. Among those hospitalized for EM, the rate of experiencing a TBI within one year of discharge was 1.3% (95%CI: 1.0-1.7). 5.3% of patients with a previous history of TBI experienced a TBI within one year compared to only 1.0% of older patients without a previous history of TBI. Having a previous history TBI was associated a greater likelihood of having another TBI within one year (HR: 4.66 [2.73 – 7.97]), while patients who were discharged from a skilled nursing facility (SNF) were less likely compared to those discharged from an acute hospital (HR: 0.29 [0.09 – 0.92]). Having a previous history of TBI was not associated with mortality or readmission. However, being hospitalized for any specific type of EM (vs. other type) and being discharged from a SNF (vs. acute hospital) were associated with an increased likelihood of death or readmission among older adults hospitalized for EM.

Conclusions: This study demonstrates that older adults with a previous history of TBI may experience EM and sustain a future TBI. In addition, older adults who have experienced EM are at an increased risk for death and mortality. Efforts should be made to increase screening for EM among hospitalized older adults to provide the necessary supports to ensure that they are returning to safe environments following discharge, especially patients discharged from a SNF.

610 Sub-Symptom Threshold Aerobic Exercise For Patients With Persisting Post-Concussion Symptoms And Exercise Intolerance After Mild Traumatic Brain Injury – Preliminary Results From A Randomized Controlled Trial.

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ABSTRACT

Background: Persistent post-concussion symptoms (PPCS) affect between 34 and 46% of patients following mild traumatic brain injury (mTBI), and many experience exercise intolerance. Sub-symptom threshold aerobic exercise, SSTAE, characterized by exercise intensity below symptom-exacerbating levels, has been proposed as a treatment to reduce the symptom burden and increase exercise tolerance. However, its effectiveness in the persistent phase after mTBI remains unclear. This study aimed to compare the effectiveness of SSTAE to treatment as usual, including standard physical activity advice, tailored to symptom levels.

Methods: Randomized, controlled, single-blind parallel-group study with follow-up at 12 weeks and 6 months. Patients from outpatient TBI clinic at Oslo University Hospital (OUH) aged 18 - 60 with PPCS lasting 3-24 months and exercise intolerance were recruited and randomized into intervention or control group. All patients received the BCTT and follow-ups at the outpatient clinic. The intervention group received in addition a 12-week SSTAE-program consisting of two sessions with PT, retests every 3rd week and exercise diaries to optimize dosage and progression. Primary outcome: Symptom burden, measured with the Rivermead Post-Concussive Symptom Questionnaire (RPQ). Secondary outcome: Symptom threshold (% of HRmax at test cessation) measured with the Buffalo Concussion Treadmill Test (BCTT). The analysis was performed using mixed-effect model in the intention-to-treat population.

Results: Eighty-one patients (58% females) with exercise intolerance were included. The average age was 35.8 (SD: 10.6) years. Mean days since injury was 212 (SD 113). Primary endpoint: At baseline mean RPQ-score was 29.7 (95%CI: 25.6 – 32.1). Mixed-effect model repeated measure for RPQ, T1: -5.75 (SE: 1.6, $p<0.001$), T2: -11.1 (SE: 1.6, $p<0.001$), T1 x Group: 0.61 (SE: 2.53, $p = 0.48$), T2 x Group: 3.98 (SE: 2.5, $p=0.12$). Secondary endpoint: At baseline the symptom threshold was 69.2% of HRmax (95%CI: 65.9 – 72.55), T1: 8.8 (SE: 23, $p<0.001$), T2: 13.4 (SE: 2.4, $p=0.001$), T1 x Group: 4.98 (SE: 2.4, $p=0.068$), T2x Group: 2.6 (SE: 2.4, $p=0.373$). DISCUSSION AND

Conclusions: All patients had a significant improvement on the RPQ of 11 points from baseline to T2. However, there was no significant interaction effect between group and time for symptom burden, and the observed difference between the groups change was smaller than the minimal clinical important difference of 5 points. The symptom threshold on BCTT improved with 13.4% HRmax from baseline to T2. However, further post hoc analysis is needed to establish the interaction effect between time and group. To conclude, SSTAE did not demonstrate additional benefits over treatment as usual with tailored physical activity advice in terms of RPQ scores at 12 weeks and 6 months, and its effect of symptom threshold on the BCTT is inconclusive. Further investigation of the secondary endpoint is warranted and will be presented at the congress.

611 Behavioural and Neurophysiological Responses to Familiar Song in a Child Presenting with An Acute Disorder of Consciousness

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ABSTRACT

A disorder of consciousness (DoC) is a common sequela of severe acquired brain injury (ABI) and results from an interruption in the complex interplay between arousal and awareness. The acute period of DoC (<4 weeks) following an ABI may offer a unique window of rehabilitative opportunity to maximise early consciousness recovery and subsequently promote long term functional recovery and quality of life (Molteni et al., 2021). However, individuals presenting with a DoC are a complex rehabilitative population. These individuals are dichotomously at risk of overstimulation due to the potential for compounding cognitive deficits and associated cognitive fatigue, and under stimulation due to a profoundly impaired ability to actively participate in therapy. Hence, there is an argument that therapeutic interventions based on sensory stimulation, including music, should be considered the cornerstone of DoC rehabilitation (Edlow et al., 2021).

Current evidence supports the use of music-based interventions in the assessment and treatment of adults (aged 18+ years) presenting with a prolonged DoC (>4 weeks). Music interventions are reported to stimulate both the behavioural and neurophysiological markers of consciousness (Magee, 2018; O'Kelly et al., 2013). However, the inherent distinctions in the brain's morphology, size and functional connectivity between children and adults means that children exhibit a unique and developmentally specific response to severe ABI. Moreover, recent findings in music neurosciences highlight discernible differences in how children process music and other auditory stimuli (Bower et al., 2021). Therefore, models of ABI recovery and rehabilitative strategies developed in adult contexts are not immediately translatable to the paediatric population and child specific research is needed.

This presentation will include an overview of evidence supporting music-based interventions for children presenting with a DoC followed by the results of a prospective crossover multiple baseline case study. An 11-year-old child was recruited to this study following a severe hypoxic brain injury. They participated in three experimental sessions on day 23 of their hospital admission. During each experimental condition familiar song, speech and noise auditory conditions were presented in random order while time-locked video-EEG was collected. Descriptive statistical analysis indicated that across the three experimental sessions there were a greater number of movements and behavioural responses during the song condition compared to the speech and noise auditory conditions. Further, an increase in the broadband EEG signal in the left temporal region was unique to the song condition.

Results of this single case study objectively support that familiar song may be a superior auditory stimulus for eliciting responses indicating changes in arousal and awareness in a child presenting in an acute DoC.

615 Acceptability of Innovation to Catalyse The Residential Autonomy of Individuals Living With Moderate to Severe Brain Injury

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ABSTRACT

Context: Individuals living with moderate to severe traumatic brain injury (TBI) often face obstacles to residential autonomy. Technological innovations integrated into their daily environment have the potential to facilitate participation in daily activities and promote housing stability. However, little research has explored the acceptability of these innovations for individuals with TBI, their families, and caregivers. This gap hinders the adoption of these innovations by the individuals concerned and their loved ones.

Methods: In this mixed-method study, we conducted focus groups with TBI residents, close relatives, and staff from a specialized residential setting to explore the prospective acceptability of an AI-based environmental support innovation aimed at enhancing the residential autonomy and stability of individuals living with TBI. We also used the Unified Theory of Acceptance and Use of Technology (UTAUT2) questionnaire to provide an objective assessment of the innovation's acceptability for end-users.

Results: Thirteen individuals (residents and relatives) and two caregivers participated in two distinct focus groups and individually completed the UTAUT2 questionnaire. Overall, the prospective acceptability of the innovation was positive, although some concerns were raised, particularly regarding the availability of human contact, the robustness of the system in emergencies, and the potential burden on caregivers, for example, in cases of inappropriate use. UTAUT2 results show that the low effort required and the facilitating context provide a good balance against the efforts needed to change daily habits and use the system.

Conclusion: Technological innovations are welcomed to facilitate daily autonomy and housing stability for individuals with TBI. Key factors for the adoption of these technologies include an optimal match with daily communication and usage habits and minimizing caregiver overload to allow them to spend more quality time with residents.

616 Visual Impairment in Patients with Acquired Brain Injury

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ABSTRACT

Visual impairment is a commonly observed symptom in patients with acquired brain injury (ABI), often affecting their

physical, cognitive, and communication functioning. Timely identification and accurate diagnosis of these issues are crucial for effective management, ultimately improving rehabilitation outcomes. This study aims to summarize the various causes of visual deficits in ABI patients, as some may be overlooked by clinicians. Here we present 6 types of clinical conditions including: (1) Visual field deficits resulting from damage to the visual pathway due to ABI, with the specific areas of vision loss depending on the location of the injury along the pathway; (2) Visual neglect or visual inattention, usually occurring after damage to the right hemisphere of the brain, which affects the ability to perceive objects or events on the left side of space; (3) Terson syndrome, a rare condition characterized by vitreous hemorrhage associated with subarachnoid hemorrhage, often due to an aneurysm rupture. The condition is a result of increased pressure in the brain, which in turn can lead to leakage of blood into the eyes; (4) Eye injury resulting from blunt trauma in patients with traumatic brain injury, leading to complications such as intraocular bleeding and retinal detachment, both of which may cause vision loss. Additionally, injuries to the orbit and surrounding soft tissue can result in misalignment of the eyeballs, leading to double vision (diplopia); (5) Injury to the cranial nerves 3, 4, and/or 6 causing diplopia resulting from different types of ABI; (6) Undiagnosed pre-existing eye conditions, such as amblyopia, strabismus, macular scarring, etc. We are a multidisciplinary team specializing in adult ABI rehabilitation. For patients with visual impairments, we closely monitor their recovery and offer compensatory strategies to address their visual deficits. Effectively managing visual impairment is crucial to achieving optimal functional outcomes in their ABI rehabilitation.

617 The Silent Code of the Caregiver

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ABSTRACT

I vividly remember the struggle of trying to find normalcy in a situation that defied it. Receiving a call from the hospital about my husband's bike accident was a "no turning back" moment in time.

I relied on my curiosity and research skills to find the right help for my husband's recovery. Embracing ambiguity became my norm as I sought answers and connected with various practitioners.

Using the same skills that helped my husband, I employ those same skills to Stand up 4 ME. Now helping other caregivers using my 4-step Stand up 4 ME Framework.

This 4-step framework:

1) FINDING THE STRENGTH WITHIN

Discovering the depth of one's internal strengths which often exceeds one's awareness. Harnessing these innate abilities to confront life's trials.

2) LAYING THE GROUNDWORK

Filling one's Resource toolbox with essential tools for the journey, including networking, thorough research, and connecting with individuals with lived experience. Together, these tools build the foundation for navigating one's journey.

3) NAVIGATING SYSTEMS

Bravely step out, advocate for oneself and those one supports and push the boundaries to ensure all needs are met and voices are heard.

4) ENERGY MANAGEMENT

Unlock the power within to become one's lifesaver - prioritize one's physical, mental, and emotional well-being. Embrace practices that nourish and sustain one's energy.

Twenty-seven years later, the journey continues. The frontline, caregiving spouse is still an integral resource for assisting one's spouse, helping to create a safe and secure environment for continuous improvement, and keeping the home running on all cylinders.

618 Chronic Brain Injury: A Guide to an Evidence Informed Examination

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ABSTRACT

Managing individuals who have sustained either traumatic or non-traumatic brain injury is often challenging for primary care providers and neurological rehabilitation specialists. To our knowledge, a formal and agreed upon standard of practice to evaluate and/or manage the complex needs of brain injury individuals and how those needs may dynamically change over time does not exist. As part of the BeHEALTHY[1] initiative, this feasibility project aligns with the goals of advancing a chronic disease management model for individuals with brain injury, their caregivers and health care providers. Following a systematic literature review, a BeHEALTHY working task force developed an easy to administer holistic and comprehensive intake tool for clinicians to utilize regardless of their specialty when managing the sequelae of chronic brain injury. Key concepts incorporated into the tool include the following 4 components. 1. A shared responsibility among the patient/family/caregivers and health care professionals emphasizing self-advocacy. 2. Promoting proactive and goal-oriented management plans aimed at meeting the dynamic and individualized needs of patients, families, and caregivers over their lifespan. 3. Emphasize collecting relevant pre-injury and post injury medical and psychosocial history including mental health. 4. Emphasize the importance of evaluating an individual's functional abilities including but not limited to their sensorimotor, neurocognitive, behavioral, social, and community needs. This presentation will review the key core components to an in-person examination of an individual with the sequalae of Chronic Brain Injury. Quantitative validated

measures for problem specific somatic, cognitive, neurobehavioral, emotional, and global functioning that can be utilized in a clinic setting will be presented. This personalized and "targeted functional exam" will provide a framework for clinicians to formulate a more specific brain injury diagnosis that leads to a more personalized comprehensive integrated management plan.

BeHEALTHY Chronic Disease Management for Traumatic Brain Injury. A collaboration led by IU School of Medicine with 15 other Traumatic Brain Injury Model Systems centers and the Tampa VA Model System. This project is federally funded in part by the Department of Health and Human Services, Administration for Community Living, National Institute on Disability Independent Living and Rehabilitation Research (grant #90DPHF0006-01-00).

619 Interdisciplinary Care of a 15 Year Old Male Patient Suffering from Unresolving Post-Concussion Syndrome Symptoms Secondary to High School American Football Trauma: A Case Report

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ABSTRACT

Objective: To present chiropractic cranial care of a 15-year-old patient suffering from unresolving post-concussion syndrome secondary to multiple head trauma while playing high school football (North American). American football is the most popular sport among males in the United States and has one of the highest concussion rates among high school sports.

Clinical Features: A 15-year-old patient presented to this clinic having suffered a concussion 6months prior describing multiple impacts to his body and head during a game. He noted his symptoms started with "bad" headaches but later to include photophobia and hyperacusis. At his initial office visit his headaches were constant and worse in the morning localizing bilaterally to the region of the sphenoid greater wings. He was taking Topamax to control his pain and reported a past history of orthodontic treatment. He was deeply concerned because his condition was not responding to rest or medication and his quality of life and activities of daily living were severely compromised.

INTERVENTION/ METHODS: The patient was treated at this clinic for chiropractic cranial care over two-months for 12office-visits. Chiropractic treatment included prone pelvic wedge (block) placements to treat pelvic torsion. Treatment as well focused on chiropractic manipulative therapy to the cervical and thoracic spine regions. Chiropractic cranial therapy determined a left sided temporal bone imbalanced function, which was treated.

During his assessment it was determined a referral to a functional optometrist for vision therapy exercises was necessary and also referred to a dentist to help balance his temporomandibular joint (TMJ) occlusal and condylar function. The dentist worked closely with this office so that following spinal and cranial treatments he would immediately be seen by the dentist, three-visits over one-week. The dental care involved use of a lower occlusal splint to control the patient's excessive clenching, aggravated by the concussion. LiveO2 (hyper-oxygenation) therapy was also instituted to increase oxygenation aiding brain function and improving his outcome.

Outcome: One-month following instituting care at this office the patient reported he was only experiencing relatively slight deficits in impaired memory, difficulty concentrating, brain fog, fatigue, and apathy, and reported his other symptoms were greatly reduced so that he was no longer taking medication. At the two-month mark he was re-examined (12thoffice-visit) and was only experiencing a slight headache and fatigue after physically exercise. At the six-month and one-year follow-up check in, the patient had started back to full physical activity and returned to playing football, though was cautioned due to possibility of recurrent head trauma and subsequent concussions.

Conclusion: This case represents a 15-year-old male patient's response to novel interdisciplinary care of his prior unresolving post-concussion syndrome symptoms. Further research is needed to determine what subset of pediatric patients with head trauma.

620 Improving Veterans' Brain Health using a Learning Health Systems Framework

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ABSTRACT

Although science regarding means by which to improve brain health continues to move forward, a significant disconnect between research findings and clinical practice remains. This is particularly true in terms of brain health, where clinicians and patients alike struggle to connect interventions focused on physical and mental health functioning to overall brain health (e.g., cognitive functioning). To address this real-world problem, the Department of Veterans Affairs is funding a Brain Health Coordinating Center (BHCC) to improve quality and outcomes of care, with the goal of promoting brain health and preventing brain injuries (e.g., cerebral vascular accidents) and brain-based diseases (e.g., dementia). BHCC efforts will be guided by the Learning Health Systems (LHS) framework. Adoption of the LHS framework has been shown to reduce quality gaps. During this presentation BHCC leadership will: introduce the LHS framework; discuss initial targets for brain health improvement (i.e., blood pressure, depression, sleep); highlight processes and evidence-based tools (e.g., metrics, dashboard) planned for use to modify multi-dimensional factors contributing to overall Veteran brain health; and introduce measurement-based care (i.e., systematic assessment of data used to guide patient and provider clinical decision making) as a core clinical practice. For example, even

though depression is known to impact short- and long-term brain health, at present only about a third of individuals within the Veterans Health Administration with diagnosed depression are receiving systematic measurement of their symptoms (i.e., Patient Health Questionnaire-9) to evaluate treatment progress. Variability in measure administration by provider and patient cohorts is notable. In addition to measuring patient-, provider-, and facility-level outcomes, the BHCC team will be evaluating implementation efforts using the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, Maintenance). Long-term the team plans on creating a Brain Health Vital Sign score, derived from electronic medical record data to: highlight the current state of individual Veteran's brain health; identify factors that are contributing to the individual's brain health; and, promote personalized strategies (within and outside the medical system) to promote brain health. It is expected that efforts outlined above will contribute to Veterans receiving more equitable care, as well as decrease the existing gap between research and clinical practice.

624 Fatigue In Post-Stroke Patients in Subacute And Chronic Phase: A Scoping Review

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ABSTRACT

Introduction / Rationale: Post-stroke fatigue (PSF) is a significant issue in stroke survivors, particularly during the subacute and chronic phases of recovery. PSF prevalence range between 25-85% and can severely limit engagement in rehabilitation and daily functioning. Despite its high prevalence, PSF remains under-researched and under-treated, with mechanisms and optimal management strategies still unclear. This review seeks to synthesize the existing evidence on PSF, specifically focusing on patients in the subacute and chronic phases of stroke, and to identify gaps in the literature to inform clinical practice.

Objectives: The purpose of this scoping review is to identify and summarise the existing literature on fatigue in post-stroke patients in subacute and chronic phases of recovery in order to update the evidence base. The objectives was focused to the definitions, theoretical models, influencing factors and to summarize the assessment methods in adult patient after stroke.

Method / Approach: A systematic search was conducted across databases including PubMed, OVID, Scopus, and Web of Science, covering studies published from 2014 to 2024. Keywords included "post-stroke fatigue," "subacute," "chronic," "fatigue assessment" and "fatigue management". Eligible studies involved adults in the subacute or chronic phase post-stroke and addressed PSF in terms of prevalence, influencing factors, assessment, or fatigue management. Data extraction included study design, participant characteristics, outcome measures, and intervention effectiveness. The findings were synthesized thematically to identify trends, knowledge gaps, and practice implications. Exclusion criteria included studies focusing on acute stroke phases or non-adult populations.

Results and or Practice Implications: A total of 683 studies were found. 451 remained after removing duplicates. Abstract and title screening further reduced this to 139 articles. Full-text review was conducted using inclusion criteria, resulting in 26 studies included in the final review that fall into one of the categories: definition of PSF, PSF theoretical models, PSF assessment.

The results indicate that PSF is most prominent in the subacute and chronic phases with higher prevalence in those with comorbidities such as depression or sleep disorders. Fatigue is often underdiagnosed due to the lack of standardized tools specifically designed for stroke patients in these phases. Available assessment tools such as the Fatigue Severity Scale (FSS) and the Fatigue Impact Scale (FIS) are commonly used but lack stroke-specific validation.

Conclusion: PSF in the subacute and chronic phases is a complex condition requiring targeted assessment and intervention strategies. This scoping review highlights the need for standardized diagnostic criteria and more robust RCTs to produce the evidence for recommendations in clinical practice. The review further highlights a critical need for multidisciplinary approaches and individualized rehabilitation programs tailored to fatigue management.

625 Clinical Hypnosis in Rehabilitation of Working Memory After Acquired Brain Injury: A Randomized Controlled Trial

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ABSTRACT

Objective: This randomized controlled trial (RCT) investigates the effectiveness of hypnosis in improving working memory (WM) among patients with acquired brain injury (ABI), through comparing it´s effect to an active and a passive control group. The establishment of cost-effective, evidence-based interventions for WM deficits following ABI is essential. Although clinical hypnosis has shown remarkable efficacy across various medical conditions, its potential in cognitive rehabilitation is still underexplored. Drawing inspiration from the groundbreaking work of Lindeløv et al. (2017), which highlighted significant improvements in WM through hypnosis, this study seeks to replicate those findings within a Norwegian context. Additionally, it aims to broaden the scope of analysis by incorporating every day life outcomes and examining self-efficacy as a potential mechanism in the effect of hypnosis. Ultimately, this study aims to contribute to

effective, low-cost rehabilitation strategies that empower ABI patients to maximize their cognitive outcomes and improve their quality of life.

Methods: Eighty patients with non-progressive acquired brain injury (ABI), at least 12 months' post-injury, have been recruited at Sunnaas Rehabilitation Hospital. The median time since injury was 42 months (Q1 = 31, Q3 = 60). The mean age of participants was 49 years (SD = 12.2), with a median education level of 14 years (Q1 = 12, Q3 = 16). Fifty-six percent of the participants were men. Eighteen participants had traumatic brain injury (TBI), 43 had experienced a stroke, and 19 were diagnosed with other conditions such as encephalitis.

Of the 80 participants, 75 had no prior experience with hypnosis, while 5 reported previous exposure. Regarding pretreatment expectations for hypnosis as an effective therapeutic intervention, none of the participants reported having no expectations, 42 expressed medium expectations, 20 indicated high expectations and had 18 no opinion.

Participants were randomized into one of three groups: hypnotic intervention with four weekly 60-minute sessions, an active control group receiving same volume of mindfulness sessions, and a passive control group. The hypnotic intervention targets enhancing working memory (WM) by invoking pre-injury abilities and visualizing brain plasticity. Outcome measures include the WM Index from WAIS-IV and self-reported WM from the BRIEF-A, along with secondary measures of memory self-efficacy, emotional distress, quality of life, and community integration. Assessments occur at baseline, post-intervention, and six months after baseline. Most patients have received interventions and second testing (T2), with 55 participants having completed the study (T3).

Results: Comprehensive baseline data will be presented at the conference, highlighting key findings relevant to the study.

Conclusion: Traditional rehabilitation approaches for working memory (WM) deficits in patients with acquired brain injury (ABI) have yielded modest results, highlighting the need for novel interventions. Hypnosis, a proven therapeutic tool in various medical fields, holds untapped potential for cognitive rehabilitation, as suggested by preliminary research. If the results of this trial replicate earlier findings, hypnosis could offer an effective, low-cost, and accessible method to boost WM, improve daily functioning, enhance self-efficacy, and elevate the quality of life for ABI patients. Moreover, success in this study could pave the way for broader applications, extending to other neurological conditions such as mild traumatic brain injury, where WM deficits are a critical concern.

626 Impact of an Interoception-Based Intervention on Self-Regulation and Executive Functioning in Adults with Mild Traumatic Brain Injuries (mTBIs)

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ABSTRACT

The purpose of this study was to examine the impact of an interoception-based intervention on self-regulation and executive functioning in adults who have sustained mTBIs, specifically concussions. Self-regulation and executive functioning are two skills that are impacted after one sustains a mild traumatic brain injury (mTBI). Interoception, one of our body's 8 senses, is the ability to recognize and perceive physiological body signals such as hunger, pain or fatigue. This poster aims to educate professionals and survivors about the positive effects of an interoception-based intervention on adults with mTBIs. While research suggests that improving interoceptive awareness can have a beneficial effect on self-regulation skills, there is a lack of research exploring its connection to mTBIs and a shortage of studies investigating its wider implications. This poster explores the intricate relationship between TBIs and interoception and why interoceptive awareness is impacted. The study used a one-group pre- and posttest design and implemented materials from the course "Concussion, Traumatic Brain Injury, and Interoception" by Dr. Meghan Chemidlin and Dr. Kelly Mahler. The study included nine participants (eight females, one male) aged 25 to 75. Two assessments, the Behavior Rating Inventory of Executive Function- Adult Version (BRIEF-A) and the Multidimensional Assessment of Interoceptive Awareness, Version 2 (MAIA-2), were used to measure self-regulation and executive functioning. Both assessments showed statistically significant changes between the pre-intervention and post-intervention scores for self-regulation and executive functioning. This was the first study to examine the impact of materials from the course 'Concussion, Traumatic Brain Injury and Interoception' on individuals with mTBIs. The results indicated that a 6-week interoception-based intervention effectively improves self-regulation and executive functioning skills in individuals diagnosed with mTBIs.

627 Yoga in Adults with Brain Injury: A Systematic Review

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ABSTRACT

Objective: The purpose of this systematic review was to conduct a comprehensive examination of the evidence, including grey literature, case studies, on the effect of yoga for individuals with acquired brain injury (ABI).

Methods: We conducted the study according to the Preferred Reporting Item for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.

Search Strategy: A librarian specializing in health science databases conducted the systematic literature in eight databases in Nov. 2021. An updated search was performed again

in July 2023. The search terms were constructed with two concepts: "brain injury" and "yoga" using various keywords and index terms. Study inclusion criteria included 1) participants who were diagnosed with ABI, 2) yoga was used as an intervention or part of interventions; and 3) primary studies.

Two reviewers independently screened the title and abstract of each study for its eligibility and met to reconcile discrepancies. If two reviewers could not reach a consensus, a third reviewer was consulted. A similar process was utilized for full text review, data extraction and risk of bias (RoB) assessment. We adopted the Down and Black Risk of Bias assessment to appraise the studies.

Data Synthesis: We screened 6,209 titles and abstracts and then reviewed 114 studies in full text. A total of 28 studies met the inclusion criteria and went on to data extraction and risk of bias assessment. The most common study design was quasi-experimental one group pre-posttest designs (n=10), followed by randomized control trials (n=8). Fifteen studies (54%) examined yoga in stroke populations, eight studies (29%) examined yoga in traumatic brain injury (TBI), four studies used a mixed ABI sample, and one study focused on people with pituitary adenoma. The number of enrolled participants ranged from 2 to 705 with only four studies enrolling more than 50 participants. Only one study applied yoga in the acute stage in an inpatient setting. Duration of the yoga classes ranged from 6 weeks to 36 weeks; 15 studies (54%) ran yoga classes for 8 weeks.

Reviewing studies that assessed motor functioning (n=9) and studies that assessed cognition (n=8), we found substantial evidence of yoga in improving outcomes such as gait speed and muscle strength, and cognition in people with ABI. Some evidence indicated that yoga might be beneficial for improving overall quality of life, general wellbeing and depression. For balance, occupation, anxiety, pain and sleep, the evidence of the benefit of yoga was weak.

Conclusion: Twenty-seven studies reported positive outcome on at least one of the measures used in the studies. While yoga interventions seem to be promising in individuals with ABI in motor functioning and cognition, the low RoB scores on the 25 studies indicated that the quality of the studies showed the need for improvement.

630 Identifying and Evaluating Factors that Affect the King-Devick Test for Sideline Concussion Assessment in Sports: A Systematic Review and Meta-Analysis

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ABSTRACT

Background: The King-Devick Test (KDT) is recommended for sideline assessment of sports-related concussions because it is simple and quick to administer. However, the sideline environment and test administration procedure can be variable and may differ based on factors such as the testing platform, administrator training, testing conditions, and timing. Importantly, these factors may be a source of variability and potentially influence KDT scores.

Purpose: Through a systematic review and meta-analysis, we sought to quantify whether and how these factors are a source of variability for KDT scores.

Study Design: Systematic review and meta-analysis.

Methods: We conducted a literature search using the Ovid-MEDLINE and PubMed databases to identify studies published in English between January 2010 and May 2024 that used the KDT for concussion assessment. Subgroup analyses were performed to assess the impact of testing platform, administrator experience, and environmental factors on KDT results.

Results: Out of 248 studies, 56 were included in the final analysis. The pooled baseline KDT score was 45.61 seconds (s) ($I2 = 99.53\%$, $p < 0.001$). Postseason mean KDT was faster than baseline 42.98 s ($I2 = 99.11\%$, $p < 0.001$), indicating practice effects. When KDT was administered using both electronic and card platforms, the mean pooled KDT score was faster (41.38 s) compared to using only the cards (44.58 s) or electronic platforms (45.27 s), suggesting that platform choice can influence results. Studies reporting KDT administered by a single assessor achieved a faster mean score than those administered by professional health care providers (41.58 vs 46.56 s), highlighting the influence of test administrators. Subgroup analysis revealed that heterogeneity (I2) remained high ranging from 87.29% to 99.68% indicating multiple and unidentified factors influenced the KDT scores. There were commonalities and differences related to age and gender of players, level of sports, test platform used, administrator, testing environment, and timing of measurements. Age as a moderator showed a significant influence on baseline KDT score with KDT scores improving (indicating faster performance) as age increased, suggesting the need for age-specific normative data. Gender, level of sports participation and environment had minimal influence on the test scores.

Conclusion: The KDT is a useful sideline screening tool for concussion evaluation. However, the accuracy and validity of KDT is influenced by inherent factors such as practice effects, administrator experience, and testing platforms type. Incorporating objective measurements such as eye tracking and establishing standardised training protocols may be valuable in reducing the subjective influence of both test takers and administrators on the test results.

759 Adjunctive Non-Invasive Vagus Nerve Stimulation Helps to Reduce Symptoms of Mild Traumatic Brain Injury

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ABSTRACT

Mild traumatic brain injury (mTBI), also known as concussion, is a leading cause of sustained physical, cognitive,

emotional, and behavioral deficits. Non-invasive vagus nerve stimulation (nVNS) has been shown to improve cognitive function, reduce inflammation, reduce breakdown of the blood-brain barrier, has neuroprotective effects, and balances the autonomic system. Due to these mechanisms, nVNS has recently been suggested as a potential adjunctive therapy for mTBI.

Methods: Data collection took place at Cherry Creek Neurology from October 2020 to September 2024. Patient selection for use of adjunctive nVNS was based on clinical diagnosis of mTBI (based on history), examination by a neurologist, elevated Neurobehavioral Symptom Inventory (NSI) score and patient willingness to engage in the trial. NSI was completed at baseline (NSI1) and approximately 3 months after starting nVNS (NSI2). Additional surveys to evaluate PTSD, depression, and anxiety were also collected. Patients were concurrently managed with standard of care, taken in context with each individual patient and circumstance. Patients were prescribed nVNS and were instructed to deliver two consecutive stimulations, twice per day. NSI1 and NSI2 scores were compared using the Mann-Whitney Test. Correlation coefficients were measured between NSI scores as well as PTSD, depression, and anxiety health surveys. The effect of injury date on severity of baseline scores and magnitude of change was tested with ANOVA.

Results: 175 patients were evaluated, of which 102 had complete data. The time since injury to the NSI1 baseline ranged from 5 days to 3.5 years. Results showed that adjunctive nVNS significantly reduced NSI scores from baseline in mTBI patients. Twenty-two of 27 NSI components showed significant improvement ($p<0.05$). NSI components that showed the most significant changes were headache (-0.79, $p = 2.1x10-7$), concentration (-0.59, $p = 0.0002$), total NSI score (-9.72, $p = 0.0003$), and affective score (-3.23, $p = 0.0004$). NSI components that showed the greatest fractional change from baseline were headache (-23.2%), nausea (-23.0%), total score (-16.4%), dizziness (-15.1%), and depression (-13.8%). Strong negative correlations were measured between NSI1 severity scores and total magnitude of change with the strongest negative correlation found between the initial NSI1 score and change in score for 'loss of balance' ($r = -0.66$). There were notable correlations between the NSI1 score for "depression" and health surveys measuring anxiety (GAD7, $r = 0.60$) and depression (PHQ9, $r= 0.66$). Time since injury did not show a significant effect when looking at the total magnitude of change in NSI scores.

Conclusion: When added to standard of care nVNS was associated with reduced symptoms resulting from mild traumatic brain injury including post-traumatic headache, poor concentration, and nausea, regardless of the time since injury to start of treatment.

802 Re-Imagining Public Health: Exploring a Community Partnership Approach to Addressing Intimate Partner Violence Related Brain Injury

Halina (Lin) Haag

The intersection of intimate partner violence (IPV) and brain injury (BI) has been nearly completely overlooked in research, practice, and policy, despite the known risk associated with the two conditions. The majority of physical injuries sustained by women as a result of IPV are from battery to the head, face, and neck, including strangulation. In the IPV context, an external force, such as blunt force trauma to the head or face or violent shaking is enough to sustain neurological deficits. The lack of research on the intersection of IPV-related BI (IPV-BI) makes for limited understanding of survivor's healthcare needs and a scarcity of services tailored to their needs. With one in three women expected to experience intimate partner violence (IPV) in their lifetime, and up to 75% of those women incurring suspected brain injuries, IPV-BI is a significant public health concern. Along with increased risk of mental health challenges, addictions, and complex health needs, IPV and BI are also associated with elevated rates of unemployment, poverty, and homelessness. These physical and social determinants of health impact women and can leave them vulnerable to ongoing violence and permanent disability. The intersection of IPV-BI is uniquely and extraordinarily complex. Each component individually presents significant challenges on multiple fronts: medically, emotionally, psychologically, economically, and socially. This complexity presents singular challenges to the development and delivery of effective, timely healthcare and social service supports. Since COVID-19, healthcare systems have experienced unprecedented strain resulting in longer wait times, fewer services available, and an inability to address the complex needs of survivors of IPV-BI, particularly in rural and remote communities. Seeking alternative approaches to addressing these gaps is of critical importance. Collaborations between knowledge producers, community-based service providers from diverse geographical areas, advocacy groups, and volunteer organizations can be one such approach. Presented here is an example of how this approach can be effective. Engaging in a community-driven collaboration with the goal of providing research expertise and knowledge support to the Canadian Royal Purple Society, the ongoing project has resulted in the development of a national campaign to address IPV-BI including public awareness events, funding and donation programs, policy impacts, and the development of blueprints for community capacity building to support and prevent IPV-BI. This ongoing project addresses a critical gap in addressing the impact of IPV-BI on survivors on both an individual and a community level. Presented here is an innovative grassroots approach to addressing the unique care needs of survivors of IPV-BI while building capacity at a local level. This talk is intended to provide insights, resources, and practical suggestions for fostering community collaborations, involve the volunteer, and work together to better support women exposed to IPV-BI.

ABSTRACT

803 "You're Not Even a Person Anymore": A Qualitative Study of Challenges and Solutions for 2S/LGBTQ People

Accessing Services Following a Intimate Partner Violence- Caused Brain Injury

Tori N. Stranges

INTRODUCTION: Intimate partner violence (IPV) primarily affects women and gender-diverse people. A recent study found 98% of a sample of 2S/LGBTQ Canadians had experienced IPV in their lifetime (physical, psychological, financial, sexual or identity-based abuse). While IPV can manifest in various forms, physical violence is particularly concerning due to its potential to cause significant harm, including brain injury (BI). Although incidence rates are difficult to determine, various studies have demonstrated 70% of those who have experienced IPV, had symptoms consistent with a BI as a result of physical violence. This potentially indicates a substantial number of 2S/LGBTQ people who may access a service provider organization (SPO; e.g., public, private, and mental-health care, emergency services, domestic violence shelter, victim services) after experiencing IPV-caused BI. 2S/LGBTQ survivors are likely to face unique challenges that limit access to necessary support systems following IPV-caused BI. Addressing gaps within SPOs that hinder 2S/LGBTQ survivors from receiving comprehensive, affirming care requires further investigation.

ABSTRACT

METHODS: To explore the unique challenges and solutions for 2S/LGBTQ survivors who access SPOs following IPV-caused BI, semi-structured interviews were conducted using an interpretive description approach for applied disciplines. Interviews discussed survivor and service provider experiences around 2S/LGBTQ access to SPOs, with a focus on issues and potential resolutions. Interviews were transcribed, de-identified, and analyzed. Line-by-line initial coding was used to group data which was interpreted and mobilized into challenges and informed solutions guided by expert participants.

RESULTS: Eleven service providers and three survivors participated in interviews (N=14; 10/14 (71%) identified as 2S/LGBTQ). The study identified three key challenges 2S/LGBTQ survivors may face when attempting to access SPOs with corresponding solutions. First, most SPOs operate within a cisgender, heteronormative understanding of IPV, making it difficult to recognize IPV and resulting BI within 2S/LGBTQ communities. To amend this, mandatory training and awareness campaigns were suggested as critical steps toward more inclusive care. Second, due to framing IPV in a cisgender, heterosexual lens, 2S/LGBTQ survivors, particularly racialized survivors, often feel excluded and underserved. To address this, restructuring SPOs to create inclusive, intersectional, and trauma-informed services was recommended. Lastly, the compounding effects of adverse social determinants of health (SDOH) further limit survivors' access to services. Targeted interventions addressing both IPV and the specific SDOH commonly faced by 2S/LGBTQ individuals were suggested to remedy these barriers.

CONCLUSION: Understanding the challenges 2S/LGBTQ survivors of IPV-caused BI encounter is essential for creating equitable services. Targeted solutions like mandatory 2S/LGBTQ specific SPO training, addressing adverse SDOH, and restructuring services are crucial steps. These real, urgent problems affect the lives of 2S/LGBTQ survivors, who deserve access to comprehensive, empowered, and informed care.

804 The Role of Occupational Therapy in Supporting Women Victims of Intimate Partner Violence and Traumatic Brain Injury in Child Protection Contexts

Ms. Carolina Bottari

Introduction: Intimate partner violence (IPV) often involves several forms of abuse, including physical violence, which can lead to traumatic brain injury (TBI). For women victims of IPV, TBI can significantly impair their cognitive, emotional, and physical capacities, directly affecting their ability to assume parental responsibilities. Protecting women and their children against violence from their partners requires a multitude of services, including child protection authorities and women's shelters. However, navigating legal systems, particularly those related to child protection, can be daunting for women, particularly when they must also manage the consequences of TBI and the reality of living within a women's shelter. Though occupational therapy (OT) services have the potential of providing crucial services to these women, particularly in addressing their parental roles, few OT services specialized in TBI rehabilitation are provided within the context of women's shelters in Montreal Canada.

ABSTRACT

Objectives: This study aims to explore the potential role of OT in evaluating and documenting the parenting capacities of women with possible TBI, living within women's shelters, while also considering the potential legal implications of these evaluations in judicial processes.

Methods: This study used a qualitative, descriptive, and exploratory design. Three focus groups were conducted to gather data: one involving occupational therapists (n= 6) with expertise in IPV, TBI, and child protection cases, and the other two with both occupational therapists and legal experts specializing in family law (n=1), criminal justice (n=1), and forensic evaluations (n=1). Staff from local shelters for women (n=2) also participated in all three focus groups. Data were analyzed using thematic analysis, focusing on the challenges and strategies related to supporting the parental roles of women victims of IPV with possible TBI.

Results: Preliminary findings revealed key themes and subthemes that highlight the clinical and legal complexities of these cases. These include : 1) the potential for harm due to incomplete or misinterpreted documentation, influenced by professional mandates and inconsistencies in the interpretation of reports among different professionals; 2) the multifaceted effects of IPV and TBI, which complicate accurate assessments—compounded by factors such as insufficient trauma-informed care education and societal biases affecting professional judgments; 3) strategies to address these challenges, emphasizing the need for trauma-informed approaches that integrate women's coping mechanisms and strengths.

Conclusions: In conclusion, there is a need for an increased offer of TBI-informed OT services in women's shelters and improved documentation of these services, particularly in legal contexts involving child protection. Particular attention needs to be paid to what information is (or is not) included in a report, and how it is documented. This study underscores the importance of multidisciplinary collaboration and continued education in trauma-informed care to reduce harm and enhance the support provided to women victims of IPV and TBI.

805 Cross-Sectoral Solutions: Strengthening Community Capacity to Address the 'Parallel Pandemic' of Gender-Based Violence-Related Traumatic Brain Injury Through a Survivor-Led Support Program

Gifty Asare

Background: Brain injury among survivors of gender-based violence (GBV) is a critical issue, with 75-92% of women likely experiencing traumatic brain injury (TBI) from facial, head, and neck injuries. Research in Canada reveals a significant lack of awareness and research regarding TBI among both GBV service providers and survivors, which limits supports available to those affected. The intersection of GBV and TBI is important, as each is associated with cognitive, mental, emotional, and physical health challenges as well as elevated rates of unemployment, poverty, and houselessness. These issues lead to considerable economic impacts, including lost income, and higher costs for social and health-related services, thereby highlighting the need for GBV-TBI to be widely recognized and uniquely addressed.

ABSTRACT

Aim: This project addressed the gaps in research, support, and education for GBV-TBI survivors by piloting and evaluating a trauma-informed, multi-sectoral program. Utilizing the RE-AIM framework, the study assessed the effectiveness of a live-adapted program across diverse settings and populations in Canada. This program is survivor-led and developed with the support of WomenatthecentrE's Survivor Expert Collective (WE SEC).

Methods: Twenty-five survivors from across Canada participated in a 20-week pilot program. An intake worker assisted survivors in identifying personal goals and necessary accommodations before joining the program. Participants completed a pre-survey to gather demographic data, health information, and details on their respective GBV-TBI causes and symptoms, along with their knowledge of any associated coping strategies.

Survivors were matched with peer navigators, who provided one-on-one sessions of peer support, advocacy, system navigation, and referral services. In addition, participants could engage in virtual peer support groups, workshops, and group activities, such as music therapy, yoga, naturopathy, speech language pathology, and psychotherapy. Participants completed four interim surveys over the 20 weeks to ascertain any gained knowledge and experiences and to provide, feedback allowing for real-time adaptations of the program. Upon completion of the program, a post-survey and a follow-up focus group were administered to evaluate the effectiveness and impact of the program. Quantitative data was analyzed using SPSS, while qualitative data and thematic coding was processed through MAXQDA.

Results: Participants benefited from project involvement through direct support for GBV/TBI related challenges. Some of these benefits included increased education around GBV and TBI care practices, pain management, and effective communications. Urgent needs around food access, housing, and financial security were also addressed. Participants stated feeling increased confidence and self-esteem, being better equipped to manage stress and GBV/TBI related symptoms with an overall increase in sense of community and agency.

Conclusion: The findings from this study will advance understanding of how to support survivors of GBV-TBI more effectively, and our knowledge mobilization framework will ensure adaptable sustainability efforts across the nation.

806 "You're Left on Your Own": A Qualitative Study on the Long-Term Experiences of Community Integration after Traumatic Brain Injury

Jade Witten

Introduction: Traumatic brain injury (TBI) can impact various aspects of an individual's life. Individuals with TBI often have complex healthcare needs both in the acute and long-term stages of their injury. As individuals with TBI are navigating through life after the injury, community integration is often a priority to improve quality of life. However, there is little known about the long-term experiences of community integration after TBI.

ABSTRACT

Objective: To explore the perceptions and experiences of community integration for individuals living with TBI in the community.

Method: This qualitative study used a descriptive phenomenological approach. Data was obtained from focus groups, comprised from a larger mixed-methods study. Participants were recruited through convenience sampling in British Columbia, Canada, and included if they were adults with TBI. A semi-structured interview guide on factors affecting individuals with TBI was developed in collaboration with patient partners with lived experience of TBI. Interviews were conducted with four focus groups, comprising of three to four individuals, online via Zoom. These interviews were audio- and video-recorded, and transcribed verbatim. Data were analyzed using codebook thematic analysis, and multiple investigators were involved in the data analysis process.

Results: Participants included 13 adults with TBI, between the ages of 25 and 64, who sustained their injuries between 1 and more than 20 years ago. Experiences of community integration were illustrated through three themes relating to employment or productive activity, independent living, and social activity: (1) 'Am I left on my own?' explored the support systems available after TBI, (2) 'One size fits all' described the

response of society to TBI, and (3) 'Adapting to a new normal' highlighted the response of participants to a changed reality.

Conclusion: Understanding the long-term perceptions and experiences of community integration after TBI can improve public awareness and education to facilitate community integration, through acceptance and understanding. In addition, such perceptions and experiences may inform interventions that help improve the quality of life of individuals with TBI who are living in the community.

807 Diverse Experiences of Participation: a Qualitative Study

Judith Wilson

Introduction: Participation is an outcome measure used in healthcare, conceptually imbedded in the social environment in which people live. Previous studies identified meaningfulness, self-determination, and a sense of belonging as defining qualities of participation. Participation measures vary in their focus on objective (e.g. independence or frequency) or subjective components, and vary in their included activities, resulting in limitations in comparing outcomes. Most studies show the primary predictors of participation are social factors including race, education, and marital status of the individual with the TBI, rather than injury severity, which highlights the impact of these social determinants of health.

ABSTRACT

Purpose: This study seeks to explore the relationship between the experience of participation and the social environment to understand disparate outcomes. This study used a social ecological perspective to explore how persons of color with TBI experience participation in relation to immediate support, community, and societal systems.

Methods: The qualitative study interviewed dyads consisting of a person of color with a TBI and a person they identified as important in their lives. The design used stratified purposive sampling across age group, gender, race, and participation outcome score on the PART-O. Data collection included an interview with the dyad and observations on a brief activity, providing dialogic narrative, visual narrative, and behavioral observations.

Results: The first stage of analysis used the themes meaningfulness, self-determination, belonging, (dis)satisfaction, and the social ecological levels of immediate support, community, and society. Variations were identified across all participation qualities. In some experiences, solitary, immediate social environment, and community functioned separately; others chose activities at one level based on another social level. Data reflected a complex interplay between the brain injury and other social and medical issues impacting participation. Gaps appeared between the positive narrative of some persons with TBI and their paucity in participation performance.

Conclusions: The breadth of variation in experiences of participation suggests quantitative measures need to allow for variations. Participation is best understood through both subjective measures, including resilient narratives, and objective indicators of performance. Healthcare practices should incorporate the person's medical and social complexity into individualized interventions and goals, and programs based on a social model could better address the barriers to participation.

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