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## Functional Cognition: An Opportunity to Highlight the Role of Occupational Therapy in Post-Concussion Care

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## Functional Cognition: An Opportunity to Highlight the Role of Occupational Therapy in Post-Concussion Care

### Abstract

As concern surrounding concussion and the associated long-term effects grow, a continued need for comprehensive, holistic concussion care emerges. Occupational therapists are well-equipped to address the wide variety of symptoms and deficits that clients may experience post-concussion. Functional cognition is one area in which occupational therapists can demonstrate their unique value on the interdisciplinary treatment team. In this *Opinions in the Profession* paper, we describe how occupational therapists are poised to further establish their role in post-concussion care by becoming the primary discipline for assessing and treating functional cognition. The aim of this paper is to outline the role of occupational therapy in post-concussion care in regard to becoming the primary discipline for assessing and treating functional cognition and distinguishing occupational therapists as experts in functional cognition. Implications for practice, education, and research are discussed.

### Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

### Keywords

concussion, traumatic brain injury, cognitive

### Credentials Display

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The growing global concern surrounding concussions and their potential long-term impact on participation in daily activities demonstrates a need for consistent interdisciplinary treatment. Occupational therapists recognize the immense impact that cognitive deficits may have on a client's ability to participate in occupations. One key area for occupational therapists to demonstrate their unique value on the interdisciplinary team is functional cognition. An estimated 69 million traumatic brain injuries (TBIs) occur worldwide each year, with mild traumatic brain injury (mTBI), also known as a concussion, accounting for 81.02% of injuries (Dewan et al., 2018). Varying definitions and underreporting make it challenging to determine the frequency of concussions and how the resulting symptoms impact daily lives. Data surrounding symptoms and rehabilitation are equally difficult to locate. Commonly reported symptoms of concussion include physical, cognitive, and psychosocial deficits. Although symptoms typically resolve within seven to 14 days, in 10% to 25% of mTBI clients symptoms are more persistent and can last weeks, months, or years (Polinder et al., 2018). These persistent symptoms, known as post-concussion syndrome, stand to negatively impact an individual's ability to participate in daily occupations.

Commonly reported cognitive symptoms post-concussion include memory deficits, attention and concentration deficits, decreased cognitive processing speed, and executive function deficits (Harmon et al., 2013). Although cognitive deficits are addressed, in part, by various rehabilitation professionals, functional cognition is not consistently addressed by any rehabilitation profession at this time. Functional cognition is the ability to use and integrate thinking and performance skills to accomplish complex daily activities (Giles et al., 2017). As experts in functional activities and the impact cognitive impairments have on everyday life, occupational therapists are well-equipped to serve as leaders in post-concussion care.

In this *Opinions in the Profession* paper, the authors describe how occupational therapists are poised to further establish their role in post-concussion care by becoming the primary discipline for assessing and treating functional cognition. This manuscript discusses the role of occupational therapy in post-concussion care, opportunities for establishment as experts in functional cognition, and implications for practice, education, and research.

### **Concussion**

Although no consensus has been met regarding a universal definition of concussion, common symptoms include headache, cognitive impairment, emotional lability, loss of consciousness, and sleep disturbance (Sharp & Jenkins, 2015). Concussion is a subset of TBI, classified based on injury characteristics at the less severe end of the brain injury spectrum (Harmon et al., 2013). The Centers for Disease Control and Prevention (CDC) estimates that at least 1.4 million people are treated for TBI in a hospital or emergency department each year, with 75% to 90% categorized as mTBI (U.S. Department of Health and Human Services, 2007). In addition, the CDC reports that many concussions are not treated, which can lead to prolonged recovery and a higher risk of a second, more serious injury (U.S. Department of Health and Human Services, 2007). The lack of follow-up care may leave many individuals to deal with functional cognitive and other deficits on their own, impacting their ability to participate in daily occupations.

The term "mild" can be somewhat of a misnomer with regard to TBI, since mTBI symptoms may have a long-lasting impact on an individual's daily life and ability to independently participate in occupations. Unfortunately, it is often assumed that concussion symptoms will resolve spontaneously. However, long-term symptoms, such as headache, fatigue, dizziness, impaired balance, ocular deficits, irritability, sleep disturbance, reduced concentration, impaired memory, sensitivity to light and noise,

slowed thinking, and anxiety do occur and can vary dramatically in terms of frequency and duration (Harmon et al., 2013).

As experts in physical, cognitive, and psychosocial approaches, occupational therapists can address these various deficits and play a vital role in the interdisciplinary concussion management team. In particular, occupational therapists are experts in identifying how various client factors, such as higher-level cognition, attention, and memory, may impact an individual's participation in occupations (American Occupational Therapy Association [AOTA], 2020). Although general cognitive deficits are addressed, in part, by various rehabilitation professionals, the area of functional cognition presents an ideal opportunity for occupational therapists to fill a much-needed gap in post-concussion care.

### **Functional Cognition and Concussion**

Functional cognition has been defined as the ability to use and integrate thinking and performance skills to accomplish complex daily activities (Giles et al., 2017). Rather than assessing individual cognitive skills such as attention, memory, and executive function, the goal of a functional cognition evaluation is to identify the client's "capacity to perform essential tasks given the totality of their abilities, including their use of strategies, habits and routines, and contextual and environmental resources" (Giles et al., 2020, p. 2). Functional cognition can be considered a client factor, as it is a specific capacity that influences individuals' ability to perform occupations (AOTA, 2020). Functional cognition is intricately tied to activities of daily living (ADLs), instrumental activities of daily living (IADLs), work, school, leisure, health management, sleep, and social participation, and therefore should be addressed by occupational therapists who have established their expertise in this area. While functional cognition incorporates shared components with other disciplines, occupational therapy integrates the components in a unique and holistic approach to both assessments and interventions (Wolf et al., 2019).

Minimal research exists that addresses the functional impact of cognitive deficits post-concussion. Nevertheless, available research highlights the various cognitive deficits that may be present both immediately post-concussion and at 6-month follow-up, including impaired attention, memory, language, and executive functions (Veeramuthu et al., 2015). When reassessed 2- and 5-years post-mild to moderate TBI, some clients continue to present with cognitive difficulties, which may be associated with a decline in function and decreased independence (Fleminger, 2008). Ponsford and colleagues (2011) found evidence of ongoing impairment of cognitive function based on the ImPACT Visual Memory Subtest up to 3 months post-concussion, and 27% to 30% of the mTBI group reported reduced concentration and memory difficulties that affected their daily activities. The *Consensus Statement on Concussion in Sport* (McCrory et al., 2017) notes that in most cases, cognitive recovery overlaps the time course of symptom recovery, but occasionally may precede or lag behind clinical symptom resolution; therefore, assessment of cognitive function is a vital component of assessment and return to activity.

Following a concussion, impaired cognition may significantly impact an individual's ability to return to daily activities, especially activities that require higher-level cognitive skills. Impairment in functional cognition is one component that has a significant impact on many aspects of post-concussion rehabilitation, including returning to school, returning to work, participating in health management activities, and resuming IADLs. IADLs require higher-level cognitive skills to interpret and organize information, evaluate situations, plan, and prepare (AOTA, 2020). Functional cognition is critical in navigating daily life and is an integral aspect of successful occupational engagement (Dumas & Grajo, 2021). Functional cognition includes many principles shared with other disciplines, but occupational therapy can provide a unique, holistic approach that directly addresses performance.

## Role of Occupational Therapy

The role of occupational therapy in the realm of concussion care is being established slowly. The role of occupational therapy on the interdisciplinary team is varied based on location, treatment setting, and other factors. Because of the multifactorial nature of symptoms, treatment should be coordinated by a multidisciplinary team that includes an occupational therapist (Sharp & Jenkins, 2015). There is frequent overlap in roles between occupational therapy and physical therapy, speech therapy, and other professions who work in this area of practice. For example, both occupational therapists and speech-language pathologists may address cognition; however, occupational therapists can bring a distinct focus to understanding the impact of cognitive function on everyday task performance. Occupational therapists can uniquely address cognitive function, optimizing performance through occupation-specific activities such as task and habit training approaches rather than addressing cognitive deficits in isolation.

Current guidelines for post-concussion rehabilitation include general recommendations for return to play and return to learn; these guidelines align closely with occupational therapy concepts of graded activity, activity analysis, and identification and recommendation of appropriate accommodations to promote engagement in occupations. No official practice guidelines are currently in place for concussion assessment and treatment by occupational therapists. Although AOTA has published practice guidelines for TBI, concussion treatment is not explicitly delineated in this resource (Wheeler & Acord-Vira, 2016). Occupational therapy services are recommended in the *Veterans Affairs and Department of Defense Clinical Practice Guideline for the Management of Concussion-Mild Traumatic Brain Injury* (Management of Concussion/mTBI Working Group, 2016). Although cognitive deficits and the impact on ADLs are discussed, functional cognition is not specified (Management of Concussion/mTBI Working Group, 2016). Referral to occupational therapy is suggested as one component of addressing cognitive deficits, but guidelines for therapists are minimal (Management of Concussion/mTBI Working Group, 2016). The profession of occupational therapy would benefit from clear, evidence-based practice guidelines for addressing the various deficits often present post-concussion.

Occupational therapists use a performance-based approach singular to other rehabilitation disciplines, developing occupation-based interventions based on each individual's unique values, needs, and abilities at their current level of function. Occupational therapists are distinctively qualified to provide interventions to increase independence and improve participation, well-being, and quality of life in clients after a concussion. Including an occupational therapist on the interdisciplinary treatment team when assessing clients with a concussion has shown to increase the identification of deficits, particularly relating to performance skills and performance patterns, thus providing increased opportunity for thorough, holistic care (Harris, et al., 2019). This research suggests that barriers to a client's functional activity may be under-identified in clinics that do not include an occupational therapist on their interdisciplinary team. For example, clients may be engaging in ADL and IADLs requiring lower-level cognitive function post-concussion. Therefore, difficulties with occupational performance for ADL and IADLs requiring higher-level cognitive function may not be readily identified. Including an occupational therapist on the team to holistically assess and address higher-level cognitive components may prevent clients from struggling with unaddressed post-concussive symptoms on a long-term or permanent basis.

Occupational therapy may employ a variety of approaches to intervention when addressing cognitive deficits with clients who are post-concussion, including working to restore skills and abilities that have been impaired and adapting or simplifying tasks or activities. Key features of occupational therapy interventions specific to functional cognition involve minimizing cognitive challenges to

occupational performance through performance-based approaches, including metacognitive and domain-specific strategy instruction, specific task or habit training, and environmental modification (AOTA, 2013). Wolf et al. (2019) advocate for addressing deficits in functional cognition primarily through the performance of ADLs and IADLs directly, rather than attempting to address cognitive processes individually.

Occupational therapists can help clients struggling with post-concussion symptoms across various settings, including inpatient rehabilitation, outpatient rehabilitation, and in the school system. Occupational therapists working in the school setting may encounter student-athletes along the return-to-learn continuum and are poised to provide valuable support as students resume participation in education and athletics. Occupational therapists may effectively guide the return to activity process by providing the just-right challenge in the continuum, training the client in cognitive compensatory strategies, suggesting modifications to tasks to compensate for impairments, advocating for accommodations to promote participation, or modifying the environment to promote successful engagement.

### **Implications for Practice**

Occupational therapists should provide holistic, evidence-based interventions that emphasize a graduated return to activities by supporting participation in daily occupations. Further development of consistent practice standards for the assessment and treatment for people post-concussion are needed. Concussion care is inherently complex because of the vast array of symptoms, severity, preexisting deficits, and external factors that may negatively impact many occupations and roles. Comprehensive evaluations and interventions are vital to promoting positive client outcomes.

When assessing and treating clients who are post-concussion, occupational therapists should:

- Conduct a thorough evaluation, including a comprehensive occupational profile, client factors, occupational performance assessments, symptom reports, and a complete neurological assessment (e.g., vestibular, visual, sensory, motor, etc.).
- Assess initial performance and outcomes in functional cognition through performance-based assessments to fully grasp the presented cognitive barriers that influence occupational performance skills and patterns.
- Address deficits in functional cognition primarily by directly addressing ADL and IADL performance (Wolf et al., 2019).
- Conduct in-depth client interviews to identify how symptoms and client factors affect engagement in meaningful occupations (Finn, 2019).
- Develop client-centered interventions that promote a gradual return to activity.
- Enhance occupational participation by providing training in cognitive compensatory strategies, modifying activities, or modifying the environment.
- Collaborate with the interdisciplinary team to provide comprehensive, holistic treatment (Sharp & Jenkins, 2015).
- Ensure clinical documentation includes the evaluation, intervention, and outcomes of functional cognition to demonstrate the skilled role of occupational therapists to stakeholders.

### **Implications for Occupational Therapy Education**

Further education specific to concussion is warranted to better prepare occupational therapists for emerging roles in this area of practice. A study conducted by Finn (2019) found that only 24.4% of practicing occupational therapists surveyed stated that concussion content was covered in their entry-level occupational therapy curriculum. Salisbury et al. (2017) found that occupational therapists scored lower

on concussion knowledge assessments compared to their peers in other professions. If occupational therapists are to further advocate for roles in this area of practice, occupational therapy educators must increase emerging therapists' confidence through knowledge of concussions and preparation for clinical practice with this population. Concussion content naturally coincides with content relating to TBI; however, additional emphasis and focus separate from moderate to severe TBI should be considered to increase emerging therapists' confidence regarding concussion rehabilitation. This education should emphasize relevant areas of assessment and intervention in the scope of practice for occupational therapy, including return to activities (e.g., return to work, return to play, and return to learn), vision rehabilitation, vestibular rehabilitation, and functional cognition.

Functional cognition is now recognized in the most recent edition of the occupational therapy education standards (Accreditation Council for Occupational Therapy Education, 2018). An emphasis on functional cognition in curricula will help ensure future occupational therapists are well-equipped to succeed in this critical area of practice and advocate for occupational therapy's distinct role in addressing cognitive impairment.

### **Implications for Research**

There is a significant lack of data surrounding concussions, particularly relating to cognitive rehabilitation. Minimal research exists demonstrating the cognitive deficits and recovery associated with concussion. To continue to promote the value of occupational therapy in concussion care, further data supporting occupational therapy's contributions to improved client outcomes is necessary. Further research is needed to support a more definitive role of occupational therapy in addressing functional implications and occupational participation in post-concussion care. Future research should be synthesized to develop cohesive, evidence-based practice guidelines for the treatment of post-concussion syndrome by occupational therapists. The current lack of data surrounding functional cognitive outcomes with this population provides a valuable opportunity to establish occupational therapy as a leading expert in concussion rehabilitation.

Furthermore, functional cognition has been highlighted as an important aspect of occupational therapy's role in rehabilitation across various practice settings. AOTA continues to respond to congressional action and the Improving Medicare Post-Acute Care Transformation (ImPACT) Act by working with the Centers for Medicare & Medicaid Services to advance the importance of screening for functional cognition in acute and post-acute settings across diagnostic groups (Giles et al., 2017). As occupational therapists continue to assert their role as experts in functional cognition, additional evidence supporting client outcomes will be needed in various diagnostic groups to support the use of interventions directed at the improvement of occupational performance deficits caused by cognitive impairment.

### **Conclusion**

Occupational therapists are well-equipped to establish their vital role on the interdisciplinary concussion treatment team. The realm of functional cognition is currently an emerging area where occupational therapists are poised to demonstrate their inherent value. Through opportunities in clinical practice, education, and research, occupational therapists have multiple avenues to further develop the profession's valuable contribution in post-concussion care.

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