

# Special Issue on Occupational Therapy for Adults With Traumatic Brain Injury

Janet M. Powell

## MeSH TERMS

- brain injuries
- demography
- occupational therapy
- research
- review literature as topic

Awareness of the incidence and consequences of traumatic brain injury (TBI) has increased in recent years, along with interest in knowing how best to treat this complex condition. This editorial provides an overview of the various factors that contribute to the complexity of TBI and introduces the six systematic reviews and one qualitative study included in this special issue of the *American Journal of Occupational Therapy* focusing on interventions for TBI from an occupational therapy perspective. Issues with the generation and interpretation of research evidence are discussed, along with the importance of valuing clinician expertise and client perspectives along with research findings in implementing evidence-based and evidence-informed practice.

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Janet M. Powell, PhD, OTR/L, FAOTA

This special issue of the *American Journal of Occupational Therapy* focuses on research related to traumatic brain injury (TBI). Although TBI has been termed a “silent epidemic,” awareness of the incidence and consequences of TBI has increased in recent years. Awareness has also increased of the need to determine how best to treat TBI, which in turn has resulted in increased awareness of the complexity of these injuries. Indeed, TBI remains one of the most complex conditions affecting adults who receive rehabilitation services. This complexity results from variations in multiple factors that interact to influence injury sequelae and recovery over time.

## Traumatic Brain Injury: An Increasingly Complex Field

The brain injuries that result from trauma to the head encompass a wide range of severity from mild to severe. These injuries include focal lesions that affect specific aspects of brain functioning superimposed on diffuse injuries that involve multiple brain systems. The nature of the trauma causing a TBI also varies considerably, with leading causes including falls, being struck by or striking against an object, motor vehicle crashes, and assaults

(Centers for Disease Control and Prevention, 2015).

The characteristics of the people who sustain a TBI are also highly variable, perhaps more than ever before. Although young men who engage in risky behavior, such as driving under the influence of alcohol or drugs, were once the demographic group at highest risk, older adults account for an increasing number of injuries. Blast-related injuries in military personnel, which have made TBI the signature wound of the Iraq and Afghanistan conflicts, and injuries to athletes have also added complexity to the characteristics of people who sustain a TBI. These changing demographics of the TBI population bring increased variation and complexity in premorbid cognitive and psychological function, preexisting conditions and new comorbidities, previous life experiences, socioeconomic status, drug and alcohol abuse history, social support systems, and access to resources. Genetic differences are also beginning to be recognized (Jordan, 2007). These varying client characteristics play an important role in the mechanism of injury, initial healing, neuroplasticity, participation in treatment, long-term recovery, and, perhaps most important, the differential effectiveness of various intervention approaches.

Janet M. Powell, PhD, OTR/L, FAOTA, is Associate Professor and Head, Division of Occupational Therapy, University of Washington, Seattle; [jmpowell@uw.edu](mailto:jmpowell@uw.edu)

As one would expect from an injury affecting multiple areas of the brain, the dysfunction resulting from TBI is also varied. Impairments can occur in the sensory, physical, psychological, behavioral, and language and communication domains. The nature and extent of dysfunction vary across individuals, with the degree and time frame of recovery not precisely predictable. Although severity of injury plays a major role in recovery, the relationship is not directly linear. Some people with mild TBI have unexpectedly poor recovery, whereas some with severe injury have unexpectedly good recovery. It has long been understood that many people with moderate to severe TBI experience long-lasting disability, but recently it has been suggested that for many, TBI is not a one-time event but rather the start of a lifelong chronic disease process (Masel & DeWitt, 2010).

Not surprisingly, the complexity of TBI is reflected in the wide range of TBI-focused research. Epidemiological studies have investigated the incidence and prevalence of TBI. Natural history studies have examined questions involving the recovery trajectory over time, the influence of injury and client characteristics on outcome, and the outcome measures best suited for assessing change. Medically focused research has examined the use of neuroprotective agents and pharmaceutical interventions and has sought to identify biomarkers to assist in diagnosing milder injuries and predicting clinical outcomes. Studies have investigated behavioral interventions to improve outcomes for people with TBI and their caregivers. In addition, qualitative studies have focused on the experiences and perspectives of people with TBI and those who provide care.

## Contents of the Special Issue

This special issue presents the results of six systematic reviews covering approximately 5 years of published systematic reviews and individual studies using quantitative research designs, as well as a report of a study in the qualitative research tradition. The systematic reviews were conducted in conjunction with the American Occupational Therapy Association (AOTA) Evidence-

Based Practice Project. The review questions were developed by an expert advisory group as an update to a previous set of TBI-focused systematic reviews (Golisz, 2009). Befitting such a complex condition, the questions for the systematic reviews are wide ranging. They include examination of interventions to improve arousal and alertness after TBI (Padilla & Domina, 2016) and to treat visual and visual-perceptual (Berger, Kaldenberg, Selman, & Carlo, 2016); motor (Chang, Baxter, & Rissky, 2016); cognitive (Radomski, Anheluk, Bartzan, & Zola, 2016); and psychosocial, behavioral, or emotional (Wheeler, Acord-Vira, & Davis, 2016) dysfunction. Some of the primary outcomes of interest are specific to improvement in the impairment being treated, whereas others examine the effect of the intervention on occupational performance and participation. The sixth review addresses an overarching question relating to the effectiveness of occupation- and activity-based interventions in improving performance of everyday activities and social participation (Powell, Rich, & Wise, 2016). Finally, the qualitative study by Koller and colleagues (2016) examines financial management from the experiences and perspectives of people dealing with changes in independence as a result of a TBI or other acquired brain injury.

Each of the systematic reviews in this issue presents the conclusions of the author team regarding the implications of the review findings for occupational therapy practice, research, and education. As a whole, the reviews indicate that multiple approaches and settings can facilitate recovery from TBI. Several challenges also emerge. Some of these challenges are related more to common difficulties in conducting clinical research, such as the impact of small, heterogeneous samples on the generalizability of results. Others relate to TBI clinical practice and research in general and, in some instances, to the specific role and perspectives of occupational therapy.

One challenge is the need to address multiple interrelated impairments simultaneously, making it difficult to examine the effect of a single intervention on a single impairment (Berger et al., 2016; Chang et al.,

2016). Another is the difficulty that the typical interdisciplinary or multidisciplinary nature of TBI rehabilitation brings to investigating the specific contribution of occupational therapy services (Powell et al., 2016; Wheeler et al., 2016). Several author teams highlight the need for better performance- and occupation-based outcome measures (Chang et al., 2016; Radomski et al., 2016; Wheeler et al., 2016) and for increased use of these measures as primary study outcomes (Radomski et al., 2016).

## Vision for Future Research

To overcome issues with small sample sizes, future researchers may need to collaborate on multisite studies across facilities and institutions. To address issues with concurrent interventions within occupational therapy or across disciplines, it may be feasible to examine the effect of a package of interventions and then systematically vary one element at a time through a series of studies or the use of comparison groups. More detailed reporting of intervention protocols and the role of each discipline involved will facilitate interpretation of study results and further our understanding of these complex intervention approaches.

In measuring outcomes, researchers can take advantage of ongoing efforts to identify the best currently available measures for TBI studies, such as the work toward common data elements (Hicks et al., 2013). Researchers may also benefit from efforts to develop new measures such as the Functional Status Examination, which assesses a person's postinjury performance in relation to preinjury levels across 10 categories (Dikmen, Machamer, Miller, Doctor, & Temkin, 2001). One recently developed measure of interest to occupational therapy is Participation Objective, Participation Subjective, which assesses frequency of participation in 26 activities along with the importance of each activity and the person's satisfaction with his or her performance (Brown, 2006). Greater use of the Assessment of Motor and Process Skills (Fisher & Jones, 2012, 2014) and the Evaluation of Social Interaction (Fisher & Griswold, 2014) could

help meet the need for performance- and occupation-based assessments. At the same time, we should consider the work of Whyte and Barrett (2012), who articulated the inherent difficulties in assessing the effectiveness of treatment of impairment at the activity or participation level and noted that many uncontrolled factors influence a person's performance at those higher levels.

Although many authors have identified issues with the translation of research findings into clinical practice, a much more limited discussion has addressed the challenges that surround the generation of research evidence. Sung and colleagues (2003) identified inadequate funding, rising costs, high regulatory burdens, insufficient participants, and a shortage of qualified investigators as some of the key barriers hampering the U.S. clinical research enterprise and suggested potential solutions.

Although I applaud the efforts of the AOTA Evidence-Based Practice Project and other initiatives specific to TBI to synthesize and disseminate research findings (e.g., the Global Evidence Mapping Initiative and the Evidence-Based Review of Moderate to Severe Acquired Brain Injury), I propose that the challenges in developing and conducting research studies in occupational therapy must also be identified and addressed. The recent inception of the American Occupational Therapy Foundation Intervention Research Grant Program is a good start. However, more is needed.

One of the major issues I see is the lack of an overarching research agenda that could guide investigators in systematically advancing the knowledge base related to occupational therapy and TBI. A coordinated national or even international effort is needed to identify and prioritize key research questions, study designs and methods, and funding opportunities. This effort could be modeled after the workshop held in 2010 in Denver, Colorado, in which 25 expert clinicians and scientists from four countries came together to prioritize knowledge translation activities in TBI care using a modified Delphi method (Bayley et al., 2014).

I would also like to suggest, however, that even a well-coordinated, well-executed

international research program is not enough. When I was a new occupational therapist more than 40 years ago, I believed that anything was possible. I believed that if I just knew better what to do and how to do it, and if I just did it well enough and long enough, even challenging neurological impairments could be fully, or at least close to fully, remediated. I no longer believe that to be true. What I do believe is that we can do much more to help our clients than we currently have, or ever will have, research evidence for. Too many questions and too many barriers to answering those questions exist to allow us to rely solely on research evidence for our clinical decision making. Even if we had evidence from well-replicated, positive randomized controlled trials (RCTs) for each of our intervention approaches, those results, by the very nature of RCTs, could only tell us what might be helpful in the aggregate—how the comparison groups performed on average. They cannot tell us what we should do with any one particular client at any one particular point in time in his or her particular environments and contexts.

It therefore is essential that we go back to the beginnings of the evidence-based medicine movement (Sackett, Rosenberg, Muir Gray, Haynes, & Richardson, 1996) and consider clinical expertise and client perspectives along with research findings as three valued prongs of evidence-based practice. In doing so, I would like to join those who advocate for replacing evidence-based with evidence-informed practice (Nevo & Slonim-Nevo, 2011) to better reflect both what is possible and what is important. ▲

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## References

- Bayley, M. T., Teasell, R. W., Wolfe, D. L., Gruen, R. L., Eng, J. J., Ghajar, J., . . . Bragge, P. (2014). Where to build the bridge between evidence and practice? Results of an international workshop to

prioritize knowledge translation activities in traumatic brain injury care. *Journal of Head Trauma Rehabilitation*, 29, 268–276. <http://dx.doi.org/10.1097/HTR.0000000000000053>

Berger, S., Kaldenberg, J., Selmane, R., & Carlo, S. (2016). Effectiveness of interventions to address visual and visual-perceptual impairments to improve occupational performance in adults with traumatic brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180010. <http://dx.doi.org/10.5014/ajot.2016.020875>

Brown, M. (2006). *Introduction to the Participation Objective, Participation Subjective*. San Jose, CA: Center for Outcome Measurement in Brain Injury. Retrieved from <http://www.tbims.org/combi/pops>

Centers for Disease Control and Prevention. (2015). *Injury prevention and control: Traumatic brain injury*. Retrieved from <http://www.cdc.gov/traumaticbraininjury/data/index.html>

Chang, P.-F. J., Baxter, M. F., & Rissky, J. (2016). Effectiveness of interventions within the scope of occupational therapy practice to improve motor function of people with traumatic brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180020. <http://dx.doi.org/10.5014/ajot.2016.020867>

Dikmen, S., Machamer, J., Miller, B., Doctor, J., & Temkin, N. (2001). Functional Status Examination: A new instrument for assessing outcome in traumatic brain injury. *Journal of Neurotrauma*, 18, 127–140. <http://dx.doi.org/10.1089/08977150150502578>

Fisher, A. G., & Griswold, L. A. (2014). *Evaluation of Social Interaction* (3rd ed.). Fort Collins, CO: Three Star Press.

Fisher, A. G., & Jones, K. B. (2012). *Assessment of Motor and Process Skills: Vol. 1. Development, standardization, and administration manual* (7th ed.). Fort Collins, CO: Three Star Press.

Fisher, A. G., & Jones, K. B. (2014). *Assessment of Motor and Process Skills: Vol. 2. User manual* (8th ed.). Fort Collins, CO: Three Star Press.

Golisz, K. (2009). *Occupational therapy practice guidelines for adults with traumatic brain injury*. Bethesda, MD: AOTA Press.

Hicks, R., Giacino, J., Harrison-Felix, C., Manley, G., Valadka, A., & Wilde, E. A. (2013). Progress in developing common data elements for traumatic brain injury research: Version two—The end of the

- beginning. *Journal of Neurotrauma*, 30, 1852–1861. <http://dx.doi.org/10.1089/neu.2013.2938>
- Jordan, B. D. (2007). Genetic influences on outcome following traumatic brain injury. *Neurochemical Research*, 32, 905–915. <http://dx.doi.org/10.1007/s11064-006-9251-3>
- Koller, K., Woods, L., Engel, L., Bottari, C., Dawson, D. R., & Nalder, E. (2016). Loss of financial independence after brain injury: Survivors' experiences. *American Journal of Occupational Therapy*, 70, 7003180070. <http://dx.doi.org/10.5014/ajot.2016.02198>
- Masel, B. E., & DeWitt, D. S. (2010). Traumatic brain injury: A disease process, not an event. *Journal of Neurotrauma*, 27, 1529–1540. <http://dx.doi.org/10.1089/neu.2010.1358>
- Nevo, I., & Slonim-Nevo, V. (2011). The myth of evidence-based practice: Towards evidence-informed practice. *British Journal of Social Work*, 41, 1176–1197. <http://dx.doi.org/10.1093/bjsw/bcq149>
- Padilla, R., & Domina, A. (2016). Effectiveness of sensory stimulation to improve arousal and alertness of people in a coma or persistent vegetative state after traumatic brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180030. <http://dx.doi.org/10.5014/ajot.2016.021022>
- Powell, J. M., Rich, T. J., & Wise, E. K. (2016). Effectiveness of occupation- and activity-based interventions to improve everyday activities and social participation for people with traumatic brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180040. <http://dx.doi.org/10.5014/ajot.2016.020909>
- Radomski, M. V., Anheluk, M., Bartzen, M. P., & Zola, J. (2016). Effectiveness of interventions to address cognitive impairments and improve occupational performance after traumatic brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180050. <http://dx.doi.org/10.5014/ajot.2016.020776>
- Sackett, D. L., Rosenberg, W. M. C., Muir Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *British Medical Journal*, 312, 71–72. <http://dx.doi.org/10.1136/bmj.312.7023.71>
- Sung, N. S., Crowley, W. F., Jr., Genel, M., Salber, P., Sandy, L., Sherwood, L. M., . . . Rimoin, D. (2003). Central challenges facing the national clinical research enterprise. *JAMA*, 289, 1278–1287. <http://dx.doi.org/10.1001/jama.289.10.1278>
- Wheeler, S., Acord-Vira, A., & Davis, D. (2016). Effectiveness of interventions to improve occupational performance for people with psychosocial, behavioral, and emotional impairments after brain injury: A systematic review. *American Journal of Occupational Therapy*, 70, 7003180060. <http://dx.doi.org/10.5014/ajot.2016.020677>
- Whyte, J., & Barrett, A. M. (2012). Advancing the evidence base of rehabilitation treatments: A developmental approach. *Archives of Physical Medicine and Rehabilitation*, 93 (Suppl.), S101–S110. <http://dx.doi.org/10.1016/j.apmr.2011.11.040>