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Promoting Research in Cognitive Neuroscience and Cognitive Rehabilitation

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Promoting Research in Cognitive Neuroscience and Cognitive Rehabilitation

Stroke, traumatic brain injury (TBI), and a variety of other diseases and injuries can impair cognitive function, with resulting impacts on personal, social, and vocational realms. Indeed, it is the cognitive and behavioral results of these central nervous system (CNS) insults that lead to the most serious long-term disability. Despite the fact that cognitive impairments are common and disabling, and that those who suffer from them are frequently the recipients of inpatient and outpatient rehabilitation services, current practice of cognitive rehabilitation rests on a very sparse evidence base.

There are several reasons for the paucity of rigorous efficacy research in cognitive rehabilitation. Only controlled research can sort out the impact of treatment from ongoing spontaneous recovery and natural learning processes. Yet this research is extremely complex and costly to undertake. Whereas pharmacological treatment trials can often be embedded in an ongoing treatment process that is paid for by clinical dollars, experimental treatments delivered by therapists in a teaching/learning context are much more costly. A recent example studied in a multicenter trial was partial body weight supported treadmill training to improve ambulation in spinal cord injury, as compared to "usual physical therapy". It is also much more challenging to define the active ingredients of an interactive therapy provided by a clinician, than a drug or surgical procedure, and to determine the most appropriate control or comparison condition. Research is further complicated in this area by remaining controversies about the structure and neural control of normal cognitive processes, as well as the most appropriate methods for measuring those processes. Finally, there is the matter of assembling a sufficient number of patients with similar cognitive characteristics.

In the absence of rigorous evidence on the efficacy and cost-effectiveness of cognitive rehabilitation interventions, such as various approaches to speech and language therapy stroke-related aphasia, current healthcare financing mechanisms are typically reluctant to pay for these services. However, the financial and emotional toll of cognitive impairments is enormous. The absence of firm efficacy data is not, of course, evidence of the ineffectiveness of cognitive rehabilitation. Thus, at present, there may be many individuals who could benefit from cognitive rehabilitation services who are denied them because of the current state of the evidence. Only a sustained program of research in this area, informed by recent developments in cognitive neuroscience, can effectively surmount the obstacles noted above.

Researchers at Moss Rehabilitation Research Institute (MRRI), in collaboration with colleagues at a number of other institutions, are working to advance the state of research in this area, in the hopes of identifying specific cognitive rehabilitation techniques that can have a meaningful impact of real-world function. Among these efforts is the Northeast Cognitive Rehabilitation Research Network (NCRRN), funded by a grant from the National Institutes of Health (NCMRR/NICHHD), to serve as a center of excellence for research of this type. With this and other support, MRRI investigators have developed a consent-based patient registry of individuals with stroke and TBI who are interested in participating in studies on cognition. This registry can be searched for individuals with specific clinical characteristics who

might be appropriate for individual studies. A description of this registry, and its utility in large-scale programmatic research, has been published as a model for others to adopt.¹ MRRRI investigators along with their external colleagues, have collaborative investigations underway related to attention, language, praxis (the ability to plan and execute skilled movements) and action planning, and executive function (a set of overarching functions that modulate lower level cognitive functions in the service of behavioral goals).

These studies range from basic cognitive neuroscience research, seeking to better define the normal cognitive process or how it is disrupted by disease or injury, to applied treatment studies that seek to improve cognitive function through drug treatment, retraining methods, or the provision of assistive technologies. This program of research has led to the development and publication of new assessment tools, including the Moss Attention Rating Scale, the Naturalistic Action Test, and quantitative methods for understanding the state of consciousness in vegetative and minimally conscious brain injured patients. It has also led to new therapeutic approaches for TBI-related attention deficits, through medication treatment, and language deficits, through the use of computer-supported treatment and compensation methods. Many of the outcomes of this research program are disseminated through the project website www.ncrrn.org. A grant to build further infrastructure to support cognitive rehabilitation research is currently under review. If funded, it will allow MRRRI investigators and their colleagues to provide additional training and support to outside investigators conducting cognitive rehabilitation studies.

References

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