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Poststroke and Brain Injury Rehabilitation Treatment Strategies

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In the June, July, and August issues of the *Journal*, we introduced the first three parts of a four-issue special series focused on innovative, physiologic treatments for stroke and traumatic brain injury.^{1–3} These disorders are leading causes of adult disability in the United States, accounting for tremendous personal, social, and financial costs for survivors, caregivers, and society. In the June issue, Hillis has provided an up-to-date review on how physiologic treatments may optimize poststroke aphasia recovery.⁴ Choi et al.⁵ and Buxbaum et al.⁶ have presented data in the July issue relevant to poststroke spatial neglect treatment. The August issue has focused on pharmaceutical treatment of acquired adynamic speech and disordered consciousness.^{7,8}

In this issue, we consider how rehabilitative strategies can be refined and developed further. In rehabilitation science, it is absolutely critical that we move from basic discovery—new, potentially promising neurorehabilitation interventions—toward large-scale, systematic clinical studies and beyond, to their optimal application. Even within our own field, intermediate-stage studies are criticized because they do not use randomized controlled or meta-analytic methodology. However, phase III research planning is neither appropriate nor desirable when a treatment hypothesis is being refined, and its feasibility and optimal setting are being explored.⁹

This issue presents two papers on combined treatment strategies for poststroke hemiparesis, an area emerging from observational reports into systematic group studies. Malcolm et al.¹⁰ added repetitive transcranial magnetic stimulation to a modified protocol for constraint-induced therapy. Although constraint-induced therapy seems to have resulted in motor improvement, adjuvant repetitive transcranial magnetic stimulation induced changes in motor excitability in treated patients without an associated, clinically evident treatment effect. Their results suggest that the relationship between physiologic parameters and functional improvement needs clarification, as do optimal parameters for designing constraint-induced therapy to produce functional gains across individuals. Levy et al.¹¹ examined a combination of botulinum toxin A injections, evidence-based exercise therapy, and constraint-induced movement therapy in hemiparetic patients with spasticity, and motor function insufficient for constraint-induced movement therapy candidacy by standard criteria. Motor ability improved with toxin and exercise therapy, but in the four patients who became eligible, gains made with subsequent constraint-induced movement therapy unfortunately receded as spasticity returned. A larger-scale investigation of constraint-induced movement therapy in stroke survivors with

very low motor functional ability, after administering botulinum toxin A/exercise treatment, may now be indicated.

We are grateful for the opportunity to bring *Journal* readers the four-issue special series on brain injury rehabilitation. We hope these articles stimulate a continuing dialogue in the rehabilitation science community and aid in developing more studies to complete and strengthen our translational continuum.

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References

1. Barrett AM, Levy CE, Rothi LJG. Treatment Innovation in Rehabilitation of Cognitive and Motor Deficits after Stroke and Brain Injury: Physiological Adjunctive Treatments (Introduction). *Am J Phys Med Rehabil* 2007;86:423–5. [PubMed: 17515680]
2. Barrett AM, Levy CE, Rothi LJG. Poststroke and brain injury rehabilitation: spatial neglect. *Am J Phys Med Rehabil* 2007;86:513–14.
3. Barrett AM, Levy CE, Rothi LJG. Pharmaceuticals for post-stroke and brain injury rehabilitation. *Am J Phys Med Rehabil* 2007;86:603–4. [PubMed: 17667189]
4. Hillis AE. Pharmacological, surgical, and neurovascular interventions to augment acute aphasia recovery. *Am J Phys Med Rehabil* 2007;86:426–34. [PubMed: 17515681]
5. Choi KM, Lee BH, Lee C, et al. Influence of moving background on line bisection performance in the normal elderly versus patients with hemispatial neglect. *Am J Phys Med Rehabil* 2007;86:515–26. [PubMed: 17581286]
6. Buxbaum LJ, Ferraro M, Whyte J, Gershkoff A, Coslett HB. Amantadine treatment of hemispatial neglect: a double-blind, placebo-controlled study. *Am J Phys Med Rehabil* 2007;86:527–37. [PubMed: 17581287]
7. Barrett AM, Eslinger PJ. Amantadine for adynamic speech: possible benefit for aphasia? *Am J Phys Med Rehabil* 2007;86:605–12. [PubMed: 17667190]
8. Martin RT, Whyte J. The effects of methylphenidate on command following and yes/no communication in persons with severe disorders of consciousness: a meta-analysis of n-of-1 studies. *Am J Phys Med Rehabil* 2007;86:613–20. [PubMed: 17667191]
9. Barrett AM, Rothi LJG. Guest editorial: treatment innovation in behavioral rehabilitation of stroke: removing limits on recovery. *J Rehabil Res Dev* 2006;43:vii–ix. [PubMed: 17041815]
10. Malcolm MP, Triggs WJ, Light KE, et al. Repetitive transcranial magnetic stimulation as an adjunct to constraint-induced therapy: an exploratory randomized controlled trial. *Am J Phys Med Rehabil* 2007;86:707–15. [PubMed: 17709994]
11. Levy CE, Giuffrida C, Richards L, Wu S, Davis S, Nadeau SE. Botulinum toxin A, evidence-based exercise therapy, and constraint-induced movement therapy for upper limb hemiparesis due to stroke: a preliminary study. *Am J Phys Med Rehabil* 2007;86:696–706. [PubMed: 17709993]