

## **National Institute of Neurological Disorders and Stroke Extremity Constraint-Induced Therapy Evaluation Trial**

*The results of the EXCITE trial identify the potential for constraint-induced movement therapy to alter the clinical practice of stroke rehabilitation. By combining constraint and training of the weaker limb, patients experience a clinically meaningful improvement to limb and hand motor function.*

### **Lead Agency:**

National Institute of Neurological Disorders and Stroke (NINDS)/National Institutes of Health (NIH)

### **Agency Mission:**

The mission of the NINDS is to reduce the burden of neurological disease through research.

### **Principal Investigator:**

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### **Partner Agency:**

National Institute of Child Health and Human Development (NICHD)

### **General Description:**

#### **Extremity Constraint-Induced Therapy Evaluation Trial**

It is estimated that 750,000 Americans suffer a new or recurring stroke each year. Up to 75 percent of surviving stroke patients experience partial paralysis affecting the upper extremity on one side of their body that results in diminished health-related quality of life. Until recently, stroke rehabilitation strategies generally relied on experiential approaches rather than scientifically-validated evidence. NINDS and NICHD supported the EXCITE (Extremity Constraint-Induced Therapy Evaluation) trial, a multisite, randomized study, to determine the effectiveness of a rehabilitation-based intervention in post-stroke care.

Constraint-induced movement therapy, the basis for the EXCITE trial, evolved out of the observation that monkeys with partial paralysis affecting one extremity appear to learn “non use” when their attempts to use the limb immediately after injury are met with failure. Subsequent research suggested that this “non use” could be unlearned by immobilizing or constraining the unaffected arm for a period of two weeks.

Investigators used the principles of these findings to inform the design of the EXCITE trial, which resulted in a treatment of constraint-induced intervention where movement in the less affected arm was restricted for 90 percent of waking hours for a period of 14 consecutive days. With the constraint in place, patients practiced performing functionally-relevant, repetitive tasks with the paralyzed limb for up to six hours each workday. Results from the EXCITE trial indicate that patients treated with constraint-induced movement therapy following stroke experienced a significant degree of clinically-meaningful improvement to their upper limb and hand motor function compared with patients who received alternative forms of customary therapy. As the benefits of constraint-induced therapy were still evident up to 24 months following treatment, it may form the foundation for the future development of evidence-based stroke rehabilitation.

***Excellence:*** What makes this project exceptional?

The EXCITE trial is the first multi-site randomized study to demonstrate the efficacy of a rehabilitative intervention in the treatment of stroke patients with deficits to their upper extremities. This trial moves neurorehabilitative care into the area of evidence-based medicine.

***Significance:*** How is this research relevant to older persons, populations and/or an aging society?

The risk of stroke nearly doubles each decade over 55, and up to 75 percent of patients that survive a stroke experience functional limitations in the upper extremity, which are associated with diminished health-related quality of life. Developing effective, evidence-based strategies to treat these quality of life deficits is critical to the well-being of the aging population.

***Effectiveness:*** What is the impact and/or application of this research to older persons?

The participants in the EXCITE trial experienced lasting (up to 24 months), clinically-significant improvements in upper-extremity motor function and in real-world arm use. Constraint-induced movement therapy has the potential to significantly benefit stroke patients affected by upper extremity deficits if moved into the clinic.

***Innovativeness:*** Why is this research exciting or newsworthy?

The results of the EXCITE trial will potentially provide clinicians and rehabilitation specialists with the tools necessary to apply evidence-based treatment strategies to patients that experience upper limb paralysis following stroke.