**Constraint-Induced Movement Therapy - What is it?**

Constraint Induced Movement Therapy (CIMT) is a therapy that includes a cast on your child's stronger arm to encourage them to develop their more affected arm. This is similar to when a child will have patching on their stronger eye to encourage the other eye to develop vision. During CIMT, your child will work with a therapist to help develop new ways of moving and using their hands. Goals are customized to the child's interests based on the tasks that are important to them. For some children, it is gaining greater independence in daily living skills like holding a lunch tray, putting in a ponytail, or being able to text friends. This therapy builds off of your child's progress and we work to help your child transfer their successes to their everyday life at home and school.

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**1. LOCATION, LOCATION, LOCATION.**

**NOW RECRUITING KIDS! How do we best find the spot where the brain moves the hand?**

This study is open to children who are typically developing and those who have had a stroke around the time of birth. Stimulation over targeted areas of the brain can influence the activity of brain cells that may be dormant after a stroke. A traditional method that has been used to locate the area of the brain that controls hand function uses standard measurements based on the size of the skull. However, new evidence suggests that these measurements do not indicate the best site of stimulation for hand control in children with hemiparesis due to stroke. Another method of locating the optimal site for stimulation is to use non-invasive magnetic brain stimulation applied on the scalp. This study will compare the accuracy of these two methods in both typically developing children and children with hemiparesis.

The study consists of one 90-minute visit at the University of Minnesota in Minneapolis. Participants will receive a $50 Visa gift card upon completion of their participation.

**Typically developing children** must be 8-17 years old with no history of neurological diagnosis.

**Children diagnosed with hemiparesis** must be 8-17 years old and meet the following criteria:

- Stroke which occurred before, during, or up to one year after birth - confirmed by most recent MRI or CT radiologic report
- Congenital hemiparesis
- No evidence of seizure activity within the last two years

(Title: Comparing the Location of the Motor Cortex in Children Using Two Methods: EEG and TMS. Funded by: NIH CTSA/NIH CTSI/CPIRF, clinicaltrials.gov: NCT02015338)

**z.umn.edu/motorcortex**

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**2. FOLLOWING UP.**

This study is following up on children involved in an original trial (2009-2012) in the combination of non-invasive brain stimulation and constraint-induced movement therapy.

(Title: Longitudinal Outcomes in rTMS and CIMT. Funding by: NIH NICHD, IR1HD63838-1 (2009-2011) CTSI BDAC (2014-2015), clinicaltrials.gov: NCT02091687)

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**3. NEW FRONTIERS.**

This newly-funded project combines a unique form of noninvasive brain stimulation (tDCS) with a behavioral treatment (CIMT) to promote a combined intervention targeted at improving hand function. Application for regulatory approval is underway. Recruitment for this study is anticipated to begin in 2014. Please check the Gillick Research Lab website for updates.

(Title: Non-Invasive Brain Stimulation and Constraint-Induced Movement Therapy in Pediatric Hemiparesis. Funded by: NIH CTSA/NIH CTSI/CPIRF, clinicaltrials.gov: TBD)

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**TOURS AVAILABLE**

Are you a child, caregiver, clinician or researcher who would like to learn more about our research? We invite you to call or email us to schedule a time to meet the research team and tour our lab without obligation of study participation.

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**Current Funding**

- Cerebral Palsy International Research Foundation Grant
- National Institutes of Health Clinical and Translational Science Awards/ UMN Clinical and Translational Science Institute KL2, Pre-K, Biostatistical Design and Analysis Center (Mentors: Dr. Kelvin Lim, Dr. Teresa Kimberley, Dr. Kyle Rudser, Jeremiah Menk)

**Awards**

- AAMC Early Career Women Faculty Professional Development Seminar UMN Medical School Representative (Gillick)
- MNDrive Neuromodulation Fellowship (Gillick PhD Student, Rich)

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**Press** (links located at z.umn.edu/gillicklab)

- Podcast of outcomes of rTMS/CIMT Study (located in “Research Studies”)
- U of M Health Talk feature (located in “News”)

**Recent Articles**

- Cassidy J, Gillick B, Carey J. Priming the brain to capitalize on metaplasticity in stroke rehabilitation. Phys Ther, 2014

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**Teaching**

- Pediatric Rehabilitation
- Research Seminar
- Advisor to 17 graduate Physical Therapy students, 1 PhD student and 1 BME Fellow.
We believe that all children with cerebral palsy have the potential to influence their level of function throughout their lifetime, applying the latest advances in neuroscience with rehabilitation.

A note from Dr. Gillick - We continue to develop our research with great momentum and the enthusiastic children who are participating. Currently, PhD student Tonya Rich, OTR/L, along with Graduate Physical Therapy (DPT 2016) students Shannon Groth, Katelyn Kubat, Stephanie Morse, Karen Myhrman, Timothy Miller, Josa Martin and Andrea Tobias are working on a longitudinal study investigating hand function and feedback from the children who were involved in our 2009-2011 non-invasive brain stimulation and constraint-induced movement therapy study. Biomedical engineering PhD Student Edgar Pêna is working under an Integrative Graduate Education and Research Traineeship with Dr. Gillick and DPT2015 students Carly McQuillian, Josh Meuwissen, Stephanie Mathiowetz and Kaitlyn Lorsbach on a study using our new Stereotactic Neuronavigation equipment to determine the best way to target brain locations for stimulation. Both children with hemiparesis and typically developing children are included in this study. DPT 2014 students Michelle Usset, Amy Vaith, Teddi Wood, and Rebecca Worthington have completed a study with Dr. Gillick using a novel form of non-invasive brain stimulation called transcranial direct current stimulation, and hope to publish and present this work this year. Congrats graduates! As always, investigating new interventions for children with hemiparesis could not be accomplished without the participation of the children and families in these studies. For that we are most grateful.