

# Sensorimotor Training and Assessment for Adults with Hemiplegic Cerebral Palsy

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## DID YOU KNOW?

- There is growing evidence that adults with cerebral palsy ( CP ) may experience functional declines over their lifetime which may begin as early as the transitional period from late adolescence into early adulthood.
- Such changes in physical function during adulthood may seriously impact employment and participation in leisure activities.
- Despite these changes, there continues to be a decline in the availability of comprehensive health services for adults with CP.
- Physical therapy may be under utilized by adults with CP, partially because it becomes boring after years of traditional therapy and/or it is difficult to locate medical specialists with an interest in adult CP.
- Our understanding and treatment of motor deficits in persons with CP have been derived almost exclusively from children and very little is known regarding the nature of motor decline which may occur across the lifespan.

## FOCUS OF THE MOTOR CONTROL LABORATORY

Research in the Motor Control Laboratory, under the direction of Susan H. Brown, Ph.D., focuses on motor coordination across the life span and in individuals with sensorimotor deficits. Theories are combined with clinical applications to advance our understanding of the mechanisms underlying control of human move-

ment. This research provides the basis for the development of rehabilitation interventions. We work closely with the Department of Physical Medicine and Rehabilitation in the School of Medicine to assess new ways to improve arm and hand function in children and adults with CP as well as other disabilities related to movement.

**Project ULTrA** is an exciting new upper limb assessment and training program we have developed for adults with hemiplegic CP.



Motor Control Laboratory  
Division of Kinesiology  
University of Michigan



## Exercise can be fun AND beneficial

An increasing number of studies have demonstrated that muscle weakness is common in adults with CP. This weakness can be a major factor contributing to loss of physical function.

Few adults with CP participate in physical activities sufficient to maintain or increase muscle strength.

Studies have shown that muscle strength training can be beneficial and enjoyable for people with CP if done in consultation with professionals. Many public recreational facilities have recognized the need to provide such opportunities – check with your local recreational center!

## Use it ..... or lose it !!

One of the most exciting recent advances in rehabilitation has been the application of brain plasticity principles to the development of more effective therapy programs.

Studies focusing on human movement disorders such as adults with hemiplegic stroke have

found a reduction in sensorimotor areas as a result of disuse of the affected limb.

More importantly, however, is the observation that task-specific training of the affected limb can then increase the size of relevant brain areas.

*“Individuals with hemiplegia learn to compensate with their stronger arm and progressively avoid use of the weaker arm when performing activities of daily living.” (Aycock et al., 2004)*

## TRANSLATION!!!!

Most activities of daily living in persons with hemiplegia are performed by their less affected or stronger arm. The affected (weaker) arm is often slow, uncoordinated and less efficient when compared to the other arm. This decreased use means that the side of the brain controlling the affected arm gets stimulated less and less over time. Unfortunately this means that there is less area in the brain devoted to controlling the affected arm so it gets weaker and weaker. Research suggests that there is a wide discrepancy between how much the affected arm is used versus what that arm can be trained to do.

Fortunately there is some potential for the brain to “re-establish” connections, but this is dependent on the individual repetitively using his/her affected arm for functional tasks. In fact, both intensity as well as type of training are important factors in rehabilitation outcomes.

Most rehabilitation strategies aimed at improving motor function in CP have been tested on children, but there is evidence in persons with stroke that improvement is possible using task based motor training.

### TRAIN YOUR BRAIN



Recommended by Women in Neuroscience  
[www.womeninneuroscience.org](http://www.womeninneuroscience.org)

## MOTOR TRAINING WORKS!!

Drs. Susan Brown and Ed Hurvitz have recently shown that short duration motor training leads to improved arm and hand function in children with CP. With funding provided by the U.S. Department of Education, they developed a pro-

gram consisting of two 30 minute training sessions per day for six weeks. They found that upper arm and shoulder coordination significantly improved as well as hand steadiness – important for fine motor skills.



## PROJECT ULTRA

### LONG AWAITED GRANT APPROVED

Dr. Susan Brown, Dr. Colleen Lewis and Dr. Edward Hurvitz at the University of Michigan have just received a three year grant from the U.S. Department of Education ( National Institute of Disability Rehabilitation and Re-

search ) to conduct a study examining a home-based intervention aimed at improving arm and hand function in adults with hemiplegic CP. This study will be one of the first to use a home-based training program which

connects participants to our research laboratory via the internet. See our description of Project ULTRA below!

### TELL ME ABOUT IT...

The objective of this study is to determine the effectiveness of a task-specific training program (ULTRA Program) on upper limb function. The idea to be tested in this proposal is that a home-based upper limb training program will lead to improved arm and hand sensory and motor function in individuals with hemiplegic cerebral palsy.

Participants will receive individualized instruction on the task-specific

intervention training protocol (ULTRA program).

Participants will be instructed to practice a series of arm movements 5 times per week. Each training session will last approximately 40 minutes.

An innovative aspect of this intervention is that, twice a week, each participant will be joined “virtually” and will be observed during the training session online. Guidance

will be provided when necessary, and data will be recorded related to movement time and grasp force. Communication between the participant’s home and the Motor Control Lab will be via high speed Internet connections.

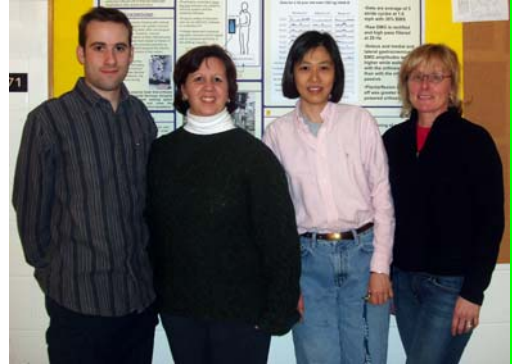
This study will be one of the first to examine an intervention program focused on upper limb coordination in [adults](#) with cerebral palsy.

**Motor Control Laboratory  
Division of Kinesiology  
University of Michigan**

401 Washtenaw Ave  
Ann Arbor, MI 48109-2214

Phone: 734-763-5829  
<http://www.motorcontrol.umich.edu/>

**Our Motor  
Control Staff**



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## **PARTICIPATE!!**

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### **ADULTS WITH HEMIPLEGIC CEREBRAL PALSY**

Research study: Project ULTrA is currently seeking adults between the ages of 18 and 50 who are able to reach forward from a sitting position and who are willing to complete a 10 week, home-based upper limb training program. Participants are required to have enough strength to reach both arms forward to head height and partially open their hands.

#### **Why should I consider joining this study as a research participant?**

This study will provide valuable information about how adults with CP use their arms and hands. This is especially critical because to date the majority of research conducted has focused on the pediatric population.

It is also possible that it might lead to some improvements in your affected arm function.

#### **Do I have to become a participant in this study? If I join the study, can I change my mind and drop out before it ends?**

Becoming a participant in this study is entirely voluntary. You may refuse to enroll or drop out at any time without penalty.

#### **What exactly will be done to me, and what kinds of treatments or procedures will I receive if I agree to be a participant in this study?**

Prior to and following the intervention you will be invited to our lab in Ann Arbor so that we can measure the quality of your movement.

You will be asked to perform a series of tasks such as reaching and grasping with sensors attached to you so that we can record your movement. None of this should cause you any discomfort and only takes 2-3 hours to complete. Free parking will be provided.

You will then receive individualized training to allow you to take part in the 10 week task specific training program. We will provide and set up all the equipment you will need **in your home**. You will have access to the research team for support and guidance via web cam throughout the 10 week program.

You will be required to complete training five times per week. Each session will involve performing a series of tasks using your arms and should take no longer than 40 minutes to complete.

#### **I don't want to be identified by this project. What will the research team do to ensure my confidentiality?**

We shall put the information collected about you during the study into a research record. This record will not show your name but will be encoded. Your research record will be kept confidential.

#### **What kinds of benefits can I expect personally from taking part in this study?**

You will receive a total of \$160 as acknowledgement of your time and expenses: \$30 for the pre-training assessment, \$100 for the 10 week training period and \$30 for the post-training assessment.

We will also keep you informed regarding the results and send you copies of any publications should you be interested.

**If you think you may be interested in participating in this study, we would like to hear from you.....**

**Please contact Colleen Lewis, Ph.D. at (734) 763-5829 or via her email: [caelewis@umich.edu](mailto:caelewis@umich.edu)**

**IRB MED NO: HUM 00000277**

**IRB MED Project Approval Expires on: 12/07/2006**

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