Welcome to our inaugural newsletter!

The Center for Cerebral Palsy Research at Teachers College, Columbia University is proud to release our very first newsletter to mark our 20th anniversary! We hope that this newsletter will provide you with an opportunity to find out more about the exciting research we are conducting at our lab, as well as update you on our findings from previous studies and other current developments in the field. We will also introduce you to members of our lab so that you get to know us better!

In This Issue:
- Laboratory News
- Research Update: Current and New Projects, Results of Completed Studies
- Staff Spotlight: Dr. Kathleen Friel
- Bonus Feature: Interview with a Kid!
- Study Recruitment Information

Who are we?

Our center was founded in 1996, and is committed to understanding the mechanisms underlying the symptoms of Cerebral Palsy and developing evidence-based treatment approaches targeting these symptoms. Research projects at our center focus on:

1) Delineating mechanisms of sensorimotor control in typically developing children and adults,
2) Elucidating the biological bases of pediatric movement disorders, and
3) Applying research-based knowledge toward developing evidence-based educational and therapeutic interventions. All three areas are intertwined, and our ultimate goal is to apply the findings of each of these to improve the lives of children with physical disabilities.

Did you know?

Our center has been at the forefront of developing and testing intensive rehabilitation approaches for kids with CP, including Constraint Induced Movement Therapy (CIMT) and intensive bimanual training (HABIT)!
Our laboratory spaces on the 10th floor of Thorndike building were remodeled and renovated this past fall. Our new and improved lab now boasts beautiful new floors, state of the art equipment and technology, and most importantly, a larger and more child-friendly space! We are delighted that this new space will give us the opportunity to accommodate more children for future camps, as well as to conduct outdoor activities (e.g. sports) inside the lab itself!

In summer 2015, we completed our 28th intensive rehabilitation training camp for children with Cerebral Palsy. 17 children participated in total, coming from as far away as Chile. In addition to the upper extremity camp for children with hemiplegia, we also adapted our camp approach to include combined upper and lower extremity training for children with bilateral CP as well as those who had undergone hemispherectomy surgery.

In addition to contributing to evidence-based medicine for children with CP, our Center is committed to outreach, with the ultimate goal to change the face of pediatric rehabilitation and healthcare reimbursement. Following up on his keynote addresses to the American Academy of Cerebral Palsy and Developmental Medicine (AACPDM) and Child Neurology, Dr. Gordon has been an invited speaker more than a dozen times in the last year, including in the U.K., Netherlands, Belgium, and Japan. Dr. Friel also gave an invited talk this year at the AACPDM.

We send our heartiest congratulations to Claudio Ferre, who recently completed his PhD in Kinesiology at Teachers College. Claudio had been involved in our camps since 2009. He is now a postdoctoral fellow at City College, CUNY. We wish him all the best in his future endeavors!

We welcome our new Research Coordinator, Karen Chin. Karen recently graduated from the Master’s program in Clinical Psychology at Teachers College, and was an interventionist for our 2014 and 2015 summer camps!
Current Projects

1) Constraint-Induced Movement Therapy (CIMT) and Hand Arm Bimanual Intensive Therapy (HABIT) for Children with Hemiplegia

While we know that CIMT and HABIT result in equal improvements in children’s hand and arm use on average, this project uses MRI (Magnetic Resonance Imaging) and TMS (Transcranial Magnetic Stimulation) to test whether certain children are more likely to benefit from one or the other.

2) Combined Upper and Lower Extremity Training for Children with Bilateral CP

Our previous studies indicate that intensive upper limb training in children with hemiplegic CP is efficacious, and application of the same principles to lower limb function have been promising thus far. After a successful pilot project in which we included rehabilitation of both the upper and lower extremities in children with hemiplegia, we have expanded such training to children with other forms of CP, such as diplegia, tetraplegia, and quadriplegia. In this study, we are examining the effects of extensive upper and lower extremity training on both hand/arm use as well as lower extremity function (e.g. balance and gait).

3) Hand Arm Bimanual Intensive Therapy (HABIT) for Children who have Undergone a Hemispherectomy

Following our successful results of bimanual training (HABIT) in children with congenital hemiplegia (CP), we recently received some seed money from the Brain Recovery Project to study bimanual training in children who have undergone a hemispherectomy. So far, work to date at our lab shows promise for HABIT in improving hand function in these children.

New Projects

1) Hand-Arm Bilateral Intensive Training and Seated Postural Control Activities in Children with Moderate-Severe Cerebral Palsy

This study will focus on motor training of the upper limbs as well as seated control of posture in children with cerebral palsy, specifically those who use the wheelchair or who present with severe deficits in the control of both arm and posture while performing reaching actions in the sitting position. We will use an external support at different sub-regions of the trunk to assist the child’s seated position for practicing simple and more complex motor tasks. Our goal is to test if this intensive training program may promote functional independence of the child while performing upper limb activities in the sitting position.

What is TMS?

We use Transcranial Magnetic Stimulation (TMS) to learn how the brain controls muscle movement. In TMS, we hold a wand shaped like a number 8 to the scalp, which releases small single bursts of magnetic energy. We give TMS pulses to different regions of the brain that control movement, and record muscle twitches using stickers placed on the surface of skin. We want to see if hand training results in any changes in how the brain controls hand movements. Single pulse TMS used in studies like ours are very safe, and there have been no reports of seizures in children. TMS is very valuable for diagnostic purposes and has a good potential for treatment. Our eventual goal is to be able to treat kids with TMS in the future!

This study was conducted to determine the feasibility of a caregiver-directed, home-based, intensive bimanual intervention for children with unilateral spastic cerebral palsy (USCP). 11 children, aged 29-54 months, received 90 hours of hand-arm bimanual intensive therapy in the home setting provided by their trained caregivers. Results suggested that bimanual training may be feasible and efficacious to deliver at home by trained/supervised caregivers, without increasing levels of parental stress. Also, caregivers demonstrated high rates of commitment to completing the entire duration of the intervention, and reported that children tolerated the activities well.


This study examined whether there is a relationship between (1) how abnormal the connections are between the brain and muscles and (2) the efficacy of intensive bimanual training in improving hand function. Results showed that the extent of abnormality of connections between the brain and muscles was a poor predictor of how effective the bimanual training was. This suggests that there is flexibility in how motor systems develop in response to rehabilitative interventions to facilitate recovery.


The objective of this study was to compare whether intensive bimanual training would be more effective with or without structured progression of skill difficulty in children with USCP. Results indicated that for intensive bimanual approaches, children make improvements regardless of whether or not they are given structured practice. However, there may be immediate added benefits of including goal training.


Following the success of intensive bimanual training in improving children’s functional abilities in the upper extremities, we collaborated with Dr. Yannick Bleyenheuft from Université catholique de Louvain in Brussels to be the first to develop intensive combined upper and lower extremity treatment (HABIT-ILE). Findings suggested that combined upper and lower extremity in an intensive training protocol may be efficacious for improving both upper and lower extremity function in children with USCP.

A huge THANK YOU to everyone who has participated in our studies and contributed to all these exciting developments and findings!!

Research Update: Results of Completed Projects

Research Update: Results of Completed Projects
1. What is your background?

I was born in a suburb of Boston, MA called Braintree. I wonder how many children born in Braintree went on to become neuroscientists? When I was 4, my family moved to central Florida, where I lived until college. I wanted to stay in a warm climate, so I went to college in Houston, TX. However, my family relocated to Massachusetts the same year I went to college. I ended up moving to Kansas City to get my doctorate, then New York for postdoctoral training. I suppose I was destined to live through cold winters! My parents, 2 brothers, sister, 2 nieces, and 4 nephews live in Massachusetts.

Although I was born with CP, and my parents noticed early signs of impairments, I was not diagnosed until after my 1st birthday. The first doctor to make the diagnosis informed my parents that I would best be put in an institution, as I would never have any abilities. Thankfully, I soon met my second doctor, a wonderful orthopedist who encouraged my parents that I’d be just fine, even though I would have some permanent impairments. Growing up, I had plenty of orthopedic surgeries and therapies, but somehow outgrew my hatred of doctors and therapists. In college, I became passionate about the brain and about research, leading me to a PhD in neurophysiology and a career in brain research!

2. What is your personal philosophy or life motto?

“People who say it can’t be done should not interrupt those who are doing it.” – George Bernard Shaw

3. What is the greatest challenge you have had to overcome in your life thus far?

People usually think my greatest challenge is CP. Often, my greatest challenge is dealing with people who think CP limits or defines me. You know, the bookstore worker who asks if I know how to read. The gas station attendant who asks who drove me to the gas station and wonders why I’ve moved to the driver’s seat (I drove myself). The cop who threatens me with a ticket for public intoxication, when I haven’t been drinking. Most of the time it’s good fodder for a future book, but it can get frustrating.

4. Tell us something that might surprise us about you.

I nearly have a black belt in taekwondo! I have been a student at Harlem Tae Kwon Do since 2011. TKD has greatly improved my strength, balance, flexibility, and endurance. One can never underestimate the satisfaction of a good punch. I also enjoy rock climbing, even though I’m weak and slightly afraid of heights! Come climb with me! The Adaptive Climbing Group (http://www.adaptiveclimbinggroup.org) is active in NYC, Boston, and Chicago, offering fun, safe rock climbing for persons with disabilities.

Staff Spotlight:
Dr. Kathleen Friel

Dr. Friel received her B.A. in Biology at Rice University, an M.S. in Neuroscience at the University of Texas Health Sciences Center at Houston, and a Ph.D. in Neurophysiology from the University of Kansas Medical Center. She completed a postdoctoral fellowship at Columbia University Medical Center. She also received a M.S. in Biostatistics from Columbia University. Her research focuses on the importance of motor activity in neurorehabilitation. She has been an integral part of many of our projects since 2009.
Interview with a Kid!

1. Tell us about yourself!
My name is Jackson and I am 8 years old. I live in Ridgefield, CT. I am in 3rd grade. I like to play soccer and my favorite team is Arsenal. My favorite class is Physics.

2. What did you enjoy most about camp?
I enjoyed the games and friends I made and I enjoyed meeting other kids like me. My mentors Ji and Michael were so nice and they made camp fun. I made lots of friends at camp. Sometimes after camp we would meet at the playground, go for a smoothie or ride the subway together. My best friend I made was Jacob. We played games together like Uno and Go Fish. Jacob and I email a lot and we got to have a sleepover in December (6 month follow up testing). This summer, we’re going to visit him at his house near Niagara Falls!

3. What did you learn from camp?
I learned to use my right hand more. Camp helped my hands grasp better. And I can tie my shoes better too.

4. Would you participate in another of our camps in the future?
Yes but it would be better if Jacob does it with me! Camp was fun and I was very sad when it ended.

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