VTCRI Neuromotor Research Clinic
The Virginia Tech Carilion Research Institute’s Neuromotor Research Clinic works to advance knowledge about effective and innovative treatment strategies for children and young adults with cerebral palsy and other neuromotor movement disorders of the central nervous system.

We seek to realize this mission by:

- conducting rigorous research studies that lead to new and promising treatments;
- continuing to refine methods for enabling children to make enduring gains in their neuromotor skills;
- improving the tools for measuring children’s neuromotor skills and structural and functional brain changes;
- sharing the results of our scientific inquiry with others worldwide;
- educating a new generation of scientists and clinicians in the fields of rehabilitation sciences;
- conducting advanced-level training and providing specialty certification for clinicians;
- engaging families and advocacy organizations in promoting evidence-based practices; and
- contributing to rapid, high-fidelity implementation of scientific findings to benefit children.

Our mission strongly supports Virginia Tech’s vision of inventing the future and goal of serving the community while also advancing education and research.

GOOD SPORT: Avid tennis player Keya has received annual therapy from our clinical research team since she was an infant. Now nine years old, Keya most recently worked—and played—with therapist Mary Rebekah Trucks six hours a day, five days a week, for four continuous weeks. Throughout her treatment, Keya has remained undaunted about wearing a soft cast on her stronger arm, a key part of the ACQUIREc therapy that has proved highly beneficial in rigorous clinical trials.
The VTCRI Neuromotor Research Clinic seeks to enable children with hemiparesis—a weakness on one side of the body due to injury on the opposite side of the brain—to make large, rapid, and enduring gains in their everyday neuromotor skills. To improve the children’s arm and hand use, our therapists use a set of rehabilitation approaches known as pediatric constraint-induced movement therapy. We have developed a special form of this therapy, ACQUIREc therapy, which includes casting a child’s stronger arm and hand and conducting high-intensity therapy for three to six hours a day, five days a week, for three or four consecutive weeks.

ACQUIREc therapy involves a systematic shaping of brain function and motor behavior through a cycle of movement, reinforcement, repetition, and refinement. The children work diligently to make steady improvements while engaged in fun activities, games, and self-help skills. The children also help set their own goals and the therapists provide multiple supports to allow each child to realize major gains.

To ensure long-term effectiveness, our therapists work in a homelike or community setting so new skills become part of a child’s everyday routine. The therapists educate parents about ACQUIREc and develop a transition plan that engages the entire family. We measure each child’s progress using standardized assessments and an individual ACQUIREc Therapy Log that therapists, parents, and children help to maintain.

Rigorous Research

The VTCRI Neuromotor Research Clinic has multiple studies planned and under way:

The CHAMP Study. This study is the world’s first large-scale, multisite randomized controlled trial to compare four forms of pediatric constraint-induced movement therapy directly. The different therapy protocols vary in intensity of therapy and in the type of constraint used. The children enrolled range from two to eight years old. The study will ultimately follow the progress of 135 children for 12 months after therapy. In addition to our research clinic, the study sites include the University of Virginia, led by Dr. Richard Stevenson, and the Ohio State University, led by Dr. Jane Case-Smith. This $4.2-million study is funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the National Institutes of Health.

The Infant CHAMP Study. This study will be the first randomized controlled trial of pediatric constraint-induced movement therapy for children aged six to eighteen months. Pilot research findings already confirm that infants adjust well to the therapy protocol. The study will not only compare different dosages and constraint conditions, but it will also include neuroimaging of the infants’ brains before and after treatment. Ninety infants will be enrolled at the Virginia Tech Carilion Research Institute and at the Ohio State University. Like the CHAMP Study, this $3.1-million study will be funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

The ACQUIREc Multiple Treatment Study. This clinical research study enrolls children and families who are planning to participate in at least two courses of ACQUIREc therapy. In the past, our team has provided treatment to some children for as many as three to ten times over multiple years as they seek to improve arm and hand skills in more complex activities. This study will provide scientific evidence for important questions about the functional outcomes and underlying changes in the brain that result from repeated high-intensity treatments.

New methods for documenting progress and treatment. Many of the tools available to measure children’s motor development are too imprecise to measure important changes that therapy may produce. We are testing and refining a number of new tools to overcome the limitations of existing methods. We are also refining the techniques for documenting the content and dosage of therapy, so clinicians and families can be assured that therapy adheres to protocols that produce evidence of strong benefits.
Our Teaching and Training Activities

Each year, the VTCRI Neuromotor Research Clinic will welcome students and research fellows from Virginia Tech, the Virginia Tech Carilion School of Medicine and Research Institute, and the Jefferson College of Health Sciences who are interested in our research and our clinical models of rehabilitation. We offer formal supervision through clinic rotations, mentoring for those interested in research, and advanced-level training for those earning doctorates, practice doctorates, and postdoctoral fellowships.

We also provide specialized training workshops and courses throughout the year for clinicians working in pediatric rehabilitation. We provide training in other countries as well. Recently we have been working in both India and Ethiopia, for example, in collaboration with Dr. Patty Coker-Bolt, an associate professor of occupational therapy at the Medical University of South Carolina.
Selected Publications


