Director's Column

University of Louisville-Frazier Rehab Institute: A winning partnership

Susan J. Harkema, Ph.D.

As Rehabilitation Research Director of KSCIRC, my mission is to implement a translational research and clinical program to support individuals with spinal cord injury. Essential to our success is the partnership between the University of Louisville and Frazier Rehab Institute. We have established a collaboration among administrators, researchers, physicians, post-doctoral fellows, residents, graduate and undergraduate students, and therapists from the areas of physiology, neurophysiology, exercise physiology, engineering, biomechanics, statistics, physiatry, nursing, physical therapy, occupational therapy. We now have over 30 team members who work together on research projects and clinical integration of therapeutic interventions aimed at recovery of function, health and quality of life after spinal cord injury.

We currently have eight ongoing research studies in humans that focus on retraining the nervous system to facilitate the recovery of standing and walking in individuals with spinal cord injury. Our studies investigate not only physiological characteristics but also secondary issues including clonus, muscle atrophy, bone loss, decreased cardiovascular function, and respiratory muscle weakness. The research is conducted in Frazier Rehab Institute's state-of-the-art facility that has a 2,400 square foot laboratory equipped with four piezoelectric force platforms, specialized in-sole pressure sensor systems and a 10-camera infra-red high-speed motion capture system for understanding the forces and positioning of the body during standing and walking. We have customized electromyographic equipment that measures the activity of the nervous system during many tasks including voluntary movement, standing and stepping. We have four patented Theriastride systems that provide body weight support that is precisely regulated to the individual's level of ability during stepping. They are distributed throughout Frazier Rehab and Neuroscience Center for both research use and clinical application of activity based rehabilitation.

We also monitor breathing and cardiovascular function and scan for changes in muscle and bone. We have four patented Therastride systems that provide body weight support that is precisely regulated to the individual's level of ability during stepping.

Frazier Rehab clinicians and technicians work both in patient care and in research, which gives us access to a very talented group of people who are experts in rehabilitation care. For example, a physical therapist or activity-based technician may provide care in the Frazier Rehab outpatient department in the morning, and then assist with one of our research projects in the afternoon. The research team is an integrated part of Frazier Rehab Institute's Spinal Cord Medicine Program. We have weekly educational seminars to discuss the clinical application of the most current scientific knowledge regarding recovery after spinal cord injury.

One direct example of clinical integration of new research findings is the ongoing cooperative agreement between the Christopher and Dana Reeve Foundation and the Centers for Disease Control and Prevention with the University of Louisville. This program is designed to translate basic science and applied research into intensive activity-based rehabilitation treatment by establishing the NeuroRecovery Network (NRN) comprised of specialized Centers at seven nationally ranked rehabilitation hospitals around the United States. The lead Center for the NRN is located at Frazier Rehab Institute. As director of the NRN, I am tremendously excited that we have enrolled over 220 patients who have been treated with Locomotor Training.

Whether it's by sharing skilled personnel, availability of state-of-the art facilities and equipment, or direct collaboration on research questions, the partnership between Frazier Rehab Institute and the University of Louisville is an invaluable part of our research and essential for our success of providing ongoing continuum of care and cure for people with spinal cord injury.

Pictured are Dr. Harkema's integrated team of researchers that work together to translate the scientific findings to the patients in the clinic.

ABOVE: The research team: Barry McKay, Daniela Terson de Paleville, Sevda Aslan, Janet Quirey, Alexander Ovechkin, Marie-Pascale Cote, Matthew Nitzken, Ashley Carter, David Beneigh, Susan Harkema, Claudia Angeli, Matthew Smith, Christie Ferreira, Yangsheng Chen. (Not shown, Douglas Stevens, Menka Sanghvi and Rebecca Smith)

BELOW: The clinical team - Kevin Johnson, Crystal Simpson, Teri Dugan, Kathy Paper, Kevin Richardson, Dario Klasic, Bryan Maddox, Anthony Gallahar, Jason Hardesty, Lee Smith, Jamie Ochsner, Erica Meadows, Briana Dockins, Djuan Means, Gregory Weathers, Matthew Green, Sara Jerousek, Carrie Zuzick, Cassidy Raibert, Doug McCoy, Brittnay Nathanson, Renee Beck, Mitch Miller, Kyle Carden, Rebekah Morton, Angel Santiago (Not in photo)