Movement Disorders Center Battles Foe with Many Faces

By Tyler Smith


Well, not so fast.

A subspecialty of neurology, movement disorders encompass a wide variety of conditions, including Parkinson’s disease, essential tremor, dystonia, Huntington’s chorea, ataxia, and other, rarer, diseases that affect the central nervous system. The disorders afflict individuals with debilitating muscle problems, including rigidity, twisting, contractions and tremors. But movement disorders can also cause a host of nonmotor issues ranging from fatigue to depression and psychosis to dementia.

“In terms of phenomenology, movement disorders involve the whole person – both movement and thinking,” said Benzi Kluger, MD, MS, a University of Colorado School of Medicine neurologist specializing in movement disorders and behavioral neurology at University of Colorado Hospital.

Kluger directs CU’s Center for Movement Disorders and Neurorestoration, an interdisciplinary initiative launched in 2012 to bring a wide spectrum of clinical care, research, education and community outreach under one institutional roof. Kluger is one of four fellowship-trained adult neurologists who staff the center, along with specialists in pediatric neurology, rehabilitation medicine, neurosurgery and psychiatry. Physical and occupational therapy and alternative medicine techniques such as acupuncture also contribute to the center’s search for effective treatments for movement disorders.

**Raising awareness.** With an interdisciplinary approach, the center aims not only to coordinate care for patients with movement disorders – who can see multiple providers during a visit to the Movement Disorders Clinic and leave with a unified treatment plan – but also to raise its state and regional profile, a key to attracting the support of the National Institutes of Health, foundations, pharmaceutical companies and philanthropists for research and clinical trial.

“We want to improve, expand and enhance the research enterprise within the center,” said Brian Berman, MD, MS, a specialist in Parkinson’s disease and dystonia. Like Kluger, Berman is especially interested in research using imaging techniques to study how neurological misfirings affect body functions.

The center recently earned recognition from the Michael J. Fox Foundation for Parkinson’s Research as the highest recruiting site in the Foundation’s international “Fox Trial Finder Challenge.” The goal of the challenge was to build a registry of Parkinson’s disease patients who can be matched to available clinical trials, Berman said.

As the winner of the competition, the Center for Movement Disorders this fall will get a day-long educational seminar, hosted by Michael J. Fox Foundation staff, that will be open to the entire Parkinson’s community.

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“It will help to establish the University of Colorado as a site of excellence in Parkinson’s disease,” Berman said.

Long history. In fact, the university and UCH are no strangers to groundbreaking research and clinical care in movement disorders. In 1988, Curt Freed, MD, now CU’s division chief of Clinical Pharmacology and Toxicology, and neurosurgeon Robert Breeze, MD, performed the first transplantation in the United States of human fetal dopamine cells – the chemical agents that help to coordinate movement – into a Parkinson’s patient.

More recently, Movement Disorders Center neurologist Maureen Leehey, MD, was involved in identifying Fragile X-associated tremor/ataxia syndrome, a hereditary neurodegenerative disorder that causes tremor, brain atrophy and deterioration of muscular coordination, or ataxia. A review of this disorder by Leehey can be found in the December 2009 issue of the Journal of Investigative Medicine.

The research continues. Leehey said her major focus today is on trials “testing possible therapies to slow down the progression” of Parkinson’s disease. The subjects of these studies vary widely – large studies of creatine, an organic acid used to supply energy to the body that has helped Parkinson’s patients increase upper-body strength; a smaller one testing the drug pioglitazone in early Parkinson’s patients; and another, sponsored by the Fox Foundation, of phenylbuterate, a naturally produced substance already approved by the FDA to treat urea cycle disorders.

Leehey is also interested in the prion process hypothesis – the idea that exposure to a substance, perhaps a virus or bacteria, through the nose or the gut may initiate a slow process of spreading cellular degeneration over years. Researchers suspect the culprit is a protein, alpha-synuclein, that causes cells to begin clumping. This process spreads from the bottom of the brainstem to the top, and then continues to most of the rest of the brain. The result: the tremor, stiffness, slowness, memory loss and behavioral changes that are hallmarks of Parkinson’s. New drugs now being developed aim to inhibit the protein from clumping, Leehey said.

These efforts join a well-established roster of movement-disorder treatments, including deep-brain stimulation, the specialty of Movement Disorder Center neurologist Olga Klepitskaya, MD, which has benefited recently from the arrival of neurosurgeon Aviva Abosch, MD, and the adoption of MRI imaging to guide the procedure.

Clearer picture. MRIs help neurologists and neurosurgeons place electrodes as accurately as possible during DBS procedures. Meanwhile, MRIs and other imaging techniques, including transcranial magnetic stimulation (TMS) – currently used to treat depression – and magnetoencephalography, which measures neuromagnetic signals emitting from the brain, are Movement Disorder Center researchers providers map brain activity in patients with movement disorders.

“We try to track the changes of electrical activity for further insight into how the brains of patients with movement disorders are altered,” Berman said. “This research could help us understand the disease better and improve treatment options.”

The insights could be applied to the cognitive as well as the physiological effects of the diseases, Kluger said. Movement-disorder patients can suffer a variety of non-motor symptoms, he said, including dementia, hallucinations, psychosis and mood disorders, as well as severe fatigue and loss of motivation. Kluger is involved in a trial examining the use of magnetoencephalography to understand the physiology of thinking and memory problems in Parkinson’s disease patients.

“Dementia is the leading cause of nursing home admissions for Parkinson’s patients,” Kluger said. “If we can understand it and develop an effective treatment, that would be a huge leap forward.”

Imaging techniques could also help researchers identify biomarkers for cognitive impairment in patients with movement disorders, he added, opening the door to “reverse engineering” – identifying brain changes and figuring out ways to intercede.
In general, Kluger said, neuro-imaging allows researchers to examine patterns of brain activity that yield the “fingerprint of diseases.” With the help of computers to sort through mountains of brain activity data, researchers may be able to pick up the disease trail earlier and start treatment.

Low-tech, high promise. The research and treatment pathways that interest the Movement Disorders Center providers aren’t all high-tech and cutting-edge, however. Leehey said one of the most promising approaches for treating the symptoms of Parkinson’s disease patients is exercise. It’s been a major area of investigation for Margaret Schenkman, PT, PhD, director of the Physical Therapy Program at the University of Colorado School of Medicine’s Department of Physical Medicine and Rehabilitation. Schenkman is principal investigator of the SPARX study, which is testing the effects of moderate to vigorous exercise on patients recently diagnosed with Parkinson’s.

In addition, Kluger recently wrapped up a study of the efficacy of acupuncture in mitigating fatigue in Parkinson’s patients, and helped to launch the center’s Supportive and Palliative Care Clinic, which blends the services of clinical and non-clinical staff in helping patients and caregivers adjust to the challenges of movement disorders and improve their quality of life.

The breadth of the center’s interests and expertise could yield enormous pay-offs, Berman concluded.

“Our goal is to approach movement disorders in a holistic manner, coupled with cutting-edge research and trials that no one else has,” he said.