



Mount
Sinai

Department of Rehabilitation and Human Performance

SPECIALTY REPORT | 2019

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Joseph E. Herrera, DO
Chair and Lucy G. Moses Professor, Department of
Rehabilitation and Human Performance, Mount Sinai
Health System

MESSAGE FROM THE CHAIR

We are excited to announce that the Department of Rehabilitation Medicine is now the Department of Rehabilitation and Human Performance—a move that signifies far more than a change in name.

For more than 100 years, we have maintained an outstanding reputation for helping individuals with disabilities—such as traumatic brain injury, spinal cord injury, stroke, minor musculoskeletal injuries, concussion, and pain—maximize their self-sufficiency and mobility so they can return to their lives and community. While our name continues to honor our excellence in the more conventional rehabilitation medicine services in which the Department already excels, it also embraces its enhanced recognition as a leader in the exciting new direction of human performance and the expanded breadth of services that we provide, all of which are designed to enhance performance along a continuum of capabilities.

Today, we additionally work with healthy individuals who want to reach higher levels of performance. They include athletes seeking to improve their physical output, as well as executives striving for enhanced cognitive abilities. The Department is investing in research and technologies to support this expanding spectrum of patients and is recruiting top innovators at all levels. In all cases, maximizing human performance is the end goal for every patient that the Department serves.

Finishing First— In an Exoskeleton

For months, New York City resident Peter Schreiner trained extensively for the New Balance 5th Avenue Mile held in September 2018, determined to win. With friends, family, and new fans cheering him on, he triumphantly crossed the finish line, first among his co-competitors. But this was no ordinary race: Mr. Schreiner is paralyzed below the chest, and he accomplished this feat in 44:19 minutes—nearly four minutes faster than the goal he had set for himself—with the help of a ReWalk™ Robotics exoskeleton. The event marked the first time that an entire heat was dedicated to paralyzed athletes using exoskeletons.

In September 2017, the 27-year-old former scuba instructor fractured his T5 vertebra in a car

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Peter Schreiner, walking to the finish line, with Eberardo Burgos, left, and Michael Elliott, both assistant trainers at the James J. Peters VA Medical Center.

Red Bull and Mount Sinai Announce East Coast Partnership

The Mount Sinai Health System's Department of Rehabilitation and Human Performance has been named the official medical services provider on the East Coast for U.S. Red Bull athletes and Red Bull's athlete performance programs. Mount Sinai joins DISC Sports and Spine Center in Newport Beach, California, which is the official medical provider for Red Bull on the West Coast. Mount Sinai and DISC will work together to help provide more than 200 Red Bull athletes across five different sports categories—action, adventure, aerial, athletic, and motorsports—with the most advanced medical care and innovative sports performance programs available in the nation.

"This very exciting partnership enables Red Bull athletes to have access to Mount Sinai's leading sports medicine specialists within the Department of Rehabilitation and Human Performance, ensuring premium care and quicker recoveries," says Joseph E. Herrera, DO, Department Chair. "Mount Sinai specialists will have the chance to work closely with DISC to provide top-notch coordinated care across the country to Red Bull athletes."

"Red Bull has been a long-time leader in the study of human performance," says David F. Putrino, PT, PhD, Assistant Professor in the Department of Rehabilitation Medicine and Human Performance at the Icahn School of Medicine at Mount Sinai, who also serves as Director of Rehabilitation Innovation for the Department's Abilities Research Center, (see story below). Dr. Putrino, who has a long-standing relationship as a consultant with the Red Bull High Performance division, adds: "This is an incredible opportunity for Mount Sinai to partner with an organization that has a globally recognized reputation for exploring the limits of human performance with their athletes and together develop elite performance models to help them achieve outstanding results."

Mount Sinai is creating an active research program to investigate and analyze human sports performance and endurance in a lab setting at the Abilities Research Center, and may also provide medical staff for coverage at events in which Red Bull athletes are competing.

The New Abilities Research Center—a Hub for Innovation

Research studies that explore the use of robotics, immersive virtual reality, wearables, and noninvasive brain and peripheral nerve stimulation techniques, and a clinical program that offers the latest rehabilitation technologies to improve motor function and reduce neuropathic pain for individuals recovering from spinal cord injury, stroke, traumatic brain injury, and other neurological conditions, are driving the mission of Mount Sinai's newly established Abilities Research Center.

Considered the innovation hub of the Department of Rehabilitation and Human Performance, the Center is being led by the Department's Director of Rehabilitation Innovation, David F. Putrino, PT, PhD, and Mar Cortes, MD, both Assistant Professors at the Icahn School of Medicine at Mount Sinai. "We are bringing together scientists, clinicians, engineers, artists, and even storytellers with one collective goal: to use

technology to enable individuals with disabilities to maximize their self-sufficiency and mobility, while also working with healthy individuals to reach for higher levels of performance," says Dr. Putrino.

Adds Dr. Cortes, "All of our projects are collaborative efforts that aim to accelerate life-changing technologies from conception to mainstream clinical adoption. Already, studies have shown that using robotic-assisted therapy can lead to significant and meaningful improvements in motor function in people with physical disabilities. Research also has demonstrated significant benefits of noninvasive brain stimulation on pain reduction. We believe that when groundbreaking treatments are developed, those discoveries must be easily accessible for patients faster and more efficiently."



David F. Putrino, PT, PhD



Mar Cortes, MD

"All of our projects are collaborative efforts that aim to accelerate life-changing technologies from conception to mainstream clinical adoption."

— Mar Cortes, MD



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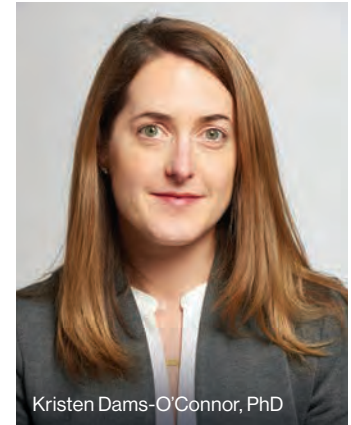
To learn more about the Abilities Research Center, visit icahn.mssm.edu/research/abilities-research-center, or email abilitiesresearchcenter@mountsinai.org.

Mount Sinai Receives \$5.4 Million Grant for Novel Study Of Traumatic Brain Injury and Alzheimer's Disease

Kristen Dams-O'Connor, PhD, Associate Professor, Department of Rehabilitation and Human Performance, and Department of Neurology, and Director of the Brain Injury Research Center, Icahn School of Medicine at Mount Sinai, has received a \$5.4 million R01 research grant from the National Institutes of Health for a five-year study, "Leveraging Existing Aging Research Networks to Investigate Traumatic Brain Injury and Alzheimer's Disease/Alzheimer's Disease-Related Dementias (LEARN TBI & AD)." Experts in advanced psychometric, epidemiological, statistical, and meta-analytic methods, along with TBI, dementia, and neuropathology researchers will evaluate associations of TBI and repetitive head impacts (RHI) with AD/ADRD.

The researchers will rely primarily on individual patient data from five ongoing longitudinal cohort studies that have already made substantive contributions to understanding AD/ADRD risk factors—Adult Changes in Thought (ACT), the Religious Orders Study (ROS), the Memory and

Aging Project (MAP), the Minority Aging Research Study (MARS), and the Framingham Heart Study (FHS). Investigators will supplement these existing data with newly collected clinical and neuropathological data to address the overarching hypothesis that TBI and RHI are independent risk factors for AD/ADRD. By leveraging data from nearly 20,000 individuals across these five studies, the investigators expect to be able to identify environmental and genetic factors that modify associations between head trauma and dementia.



Kristen Dams-O'Connor, PhD

Research Grants for Spinal Cord Injury Care and Training

■ Examining How Types of Pain Occur and Change In Spinal Cord Injury

Thomas N. Bryce, MD, Professor in the Department of Rehabilitation and Human Performance, and Medical Director of Mount Sinai's Spinal Cord Injury Program, is the principal investigator of a three-year multicenter study to understand how various types of pain occur and change over time in persons with spinal cord injury. The effort, funded by the Department of Defense Congressionally Directed Medical Research Programs, will include collaborators from Rancho Los Amigos National Rehabilitation Center, the University of Miami, and the Kessler Institute for Rehabilitation. According to Dr. Bryce: "Our goal is to present a comprehensive description of the commonness of pain subtypes and treatments, understand how pain varies over the first year of injury, identify neurosensory and psychosocial factors that may predict the later development of pain, and explore how the relationship between pain, life satisfaction, resilience, and other factors may also predict pain over time."

■ Enhancing Health Care Educational Resources for Women With Spinal Cord Injury

Stephanie A. Kolakowsky-Hayner, PhD, Associate Professor in the Department of Rehabilitation and Human Performance, will collaborate with Heather Taylor, PhD, and TIRR Memorial Hermann as site principal investigator on the 2018 Craig H. Neilsen Foundation's Creating Opportunity and Independence project, "Enhancing Healthcare for Women With Spinal Cord Injury (SCI) Through a Web-based Information Resource." Says Dr. Kolakowsky-Hayner: "After having conducted a small focus group to identify the health care needs of women with SCI,

we were overwhelmed by the extreme challenges the women reported in obtaining accurate health care information, which is scattered across the internet and often difficult to find, and identifying professionals in the community who serve women with SCI, including those in the critical specialty areas of primary care, OBGYN, and urology." The effort aims to develop a web-based resource in collaboration with professionals and women with SCI, says Dr. Kolakowsky-Hayner. Researchers will develop criteria that women with SCI should consider when selecting health care professionals, identify educational resources, and create a user-friendly online resource with a goal to help reduce barriers women face to obtaining health information and care, ultimately to improve the quality of life of women with SCI.

■ Studying the Use of Exoskeleton-Assisted Walking In the Acute Inpatient Rehabilitation Setting

Ann M. Spungen, EdD, Vice Chair of Research, Department of Rehabilitation and Human Performance, is the principal investigator of a three-year postdoctoral fellowship grant from the New York State Department of Health aimed at supporting the career development of promising fellows. The award will support training opportunities for Assistant Professor Chung-Ying (Owen) Tsai, PhD, who, with Dr. Spungen, is studying the use of exoskeleton-assisted walking (EAW) in the acute inpatient rehabilitation (AIR) setting. Specifically, the fellowship allows Dr. Tsai to gain expertise in designing and conducting a prospective, randomized control trial to determine if EAW training, when incorporated into standard AIR care, is a feasible, safe, and efficacious approach to facilitating functional independence and reducing pain and inflammatory response in those with spinal cord injury of under six months who are candidates for locomotor training.

Innovation on Display at The NYC Grand Hack

More than 200 people attended the inaugural NYC Grand Hack at the Icahn School of Medicine at Mount Sinai in November 2018. The participants came from many institutions, in fields ranging from medicine to programming. At the event, they tackled medical issues in three tracks: rehabilitation and human performance, public and mental health, and lung cancer. The hackathon was organized by a team from the Icahn School of Medicine's Department of Rehabilitation and Human Performance, along with MIT Hacking Medicine, a group of students and community members from the Massachusetts Institute of Technology that aims to energize and accelerate medical innovation.



Joseph E. Herrera, DO, third from left, and Mooyeon Oh-Park, MD, MS, Chief Medical Officer, Burke Rehabilitation Hospital, White Plains, New York, center, with members of the NYC Grand Hack second place team, from left: Hanhao Zhang; Andrew Abdou, DO; Carrie Fuller, MA, PT, Mount Sinai West; Jacob Nye; and Bina Bansinath.

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accident that occurred while he was coming home from a friend's funeral in Florida, sustaining a spinal cord injury (SCI). He had no sensation or motor function below his upper chest, and until he came to The Mount Sinai Hospital five weeks after the injury to begin a comprehensive multidisciplinary SCI rehabilitation program, he was unable to sit up, talk, eat by mouth, or even drink water. His treatment involved rehabilitation nursing; physical therapy—including locomotor training with the exoskeleton; occupational, speech, respiratory, and recreation therapy; and counseling, nutrition, and community reintegration. "At the time, this seemed so permanent," recalls Mr. Schreiner.

"It has been amazing to see Peter's progress," says Thomas N. Bryce, MD, Medical Director of Mount Sinai's Spinal Cord Injury Program. "When he was an inpatient here, we tried to get him up to use the exoskeleton, and it was very slow. He needed a lot of assistance, but very soon he was racing around here very quickly."

Finishing the race right behind Mr. Schreiner were two other Mount Sinai patients, Richard "Woody" Woods and Robert Woo, and Heather Miner (U.S. Navy Ret.), a patient at the Veterans Administration (VA) Medical Center in Dallas. All four—in T-shirts identifying them as "Team Bionic Athletes"—wore exoskeleton devices.

Ann M. Spungen, EdD, Vice Chair of Research for the Department of Rehabilitation and Human Performance at the Icahn School of Medicine at Mount Sinai, is one of the nation's top exoskeleton researchers for patients with disabilities caused by SCI. Dr. Spungen is also the Associate Director of the VA Rehabilitation Research & Development

(RR&D) National Center for the Medical Consequences of Spinal Cord Injury at the James J. Peters VA Medical Center in the Bronx—with which Mount Sinai has an affiliation.

CARF Cites Excellence in 13 Programs

The Mount Sinai Hospital—for the eighth consecutive time—has attained full accreditation from CARF, the Commission on Accreditation of Rehabilitation Facilities, demonstrating a continuing commitment to excellence in patient care by faculty and staff in the Department of Rehabilitation and Human Performance.



To achieve accreditation, rehabilitation facilities must successfully complete an onsite survey that measures compliance with a comprehensive set of quality standards. The Mount Sinai Hospital received three-year accreditation for all 13 programs it submitted for review. These programs included Stroke, Spinal Cord Injury, Brain Injury, and Amputation. The surveyors noted the interdisciplinary teamwork, leadership, cultural diversity, community outreach, and the overall high quality of clinical programs across the continuum of care. Mount Sinai also received "exemplary" recognition for its educational program related to intimacy and sexuality for individuals with spinal cord injury.

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