Winter 2013

INSIDE MossRehab

Alberto Esquenazi, MD
Chief Medical Officer, MossRehab

CHAIRMAN'S MESSAGE

What's in a name? I always wonder what names mean to different people. Recently, I was named the John Otto Haas Endowed Chair of Physical Medicine and Rehabilitation at MossRehab. This recognition is particularly important for the department and me, because it will allow us to continue to support the hard work we do in developing better clinical systems of care and in improving on rehabilitation-related research and education.

John Otto Haas and his wife, Janet, selected MossRehab as a place where they could invest in the future of rehabilitation. I am particularly touched by the fact that Janet, being a physiatrist herself, and John, an individual who has received services at MossRehab, considered endowing this chair. The Haases are not only civic-minded philanthropists with a keen sense of where to invest their money, but are also wonderful people who, by supporting our efforts, have clearly signaled to us they believe in the work we are doing. They are hoping for bigger and better things from MossRehab and the very talented people who work here.

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The Otto Haas Charitable Trust Establishes PMR Chair

The generous $1 million grant from Philadelphia's Otto Haas Charitable Trust will be used to endow the John Otto Haas Chair in Physical Medicine and Rehabilitation at MossRehab. Alberto Esquenazi, MD, Chief Medical Officer of MossRehab and Director of the Sheerr Gait and Motion Analysis Laboratory, was named the first recipient of the Chair.

"We're delighted by the kindness and good will of the Otto Haas Charitable Trust," said Dr. Esquenazi. "This grant will help us produce innovative professional development and education programs, which may include a lecture through which MossRehab would host national and international academic leaders and innovators speaking on topics designed to advance the field of rehabilitation. It will also allow our staff to spend time at other facilities throughout the world to work and learn through collaborations that could lead to some remarkable innovations."

Funding the new John Otto Haas Chair in Physical Medicine and Rehabilitation represents a new chapter in the relationship between the Otto Haas Charitable Trust and MossRehab. The recommendation for the grant was made by John Otto Haas and his wife, Janet, who are both very familiar with MossRehab. John received care at the facility and Janet, an MD, is a physical rehabilitation and brain injury specialist who worked at MossRehab nearly 25 years ago.

"Physical medicine and rehabilitation has been an important topic in our family. We have had many occasions to need the services of MossRehab," John Haas said. "I always felt fortunate to be able to go to MossRehab and receive, what always seemed to me to be, the best care in the world. Janet and I are delighted to be affiliated with MossRehab and advance its research in rehabilitation medicine."

"It is a privilege to know John and Janet," Dr. Esquenazi said. "The John Otto Haas Chair in Physical Medicine and Rehabilitation will not only help us pursue new innovations more aggressively, it will also help us perpetuate the MossRehab commitment to the field of rehabilitation."

MossRehab
EINSTEIN HEALTHCARE NETWORK

U.S. News

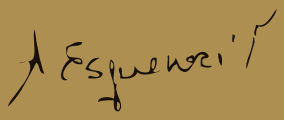
top ten in the nation

[continued from page 1]

CHAIRMAN'S MESSAGE

The funding will be focused on professional development and education in physical medicine and rehabilitation. It will allow MossRehab to attract and retain the best minds in the PM&R field and related scientific areas and to re-think what rehabilitation should be in the years to come. It will help us understand how a changing economic environment influences the way we perform research and education. And it will help us discover new ways to expand the horizons of rehabilitation science and to provide the highest levels of care with integrity and respect for the patients we serve.

All of the physiatrists based at MossRehab are proud of this achievement and what this substantial support will do for our future. I am very grateful for this recognition. It is an honor and a privilege to be named the first recipient of this chair, which carries such a prestigious name and responsibility. This is a milestone for MossRehab and for the field of physical medicine and rehabilitation. We celebrate this achievement and we accept the challenge.



Alberto Esquenazi, MD

U.S. News & World Report has once again ranked MossRehab among the top ten rehabilitation facilities in the nation.

This represents the 19th year that this news source acknowledged MossRehab as one of the country's best hospitals. In addition to this national distinction, MossRehab ranks first in the Philadelphia metropolitan area and in Pennsylvania for rehabilitation.

"This gratifying recognition is a tribute to our staff and to each of our employees who shares our commitment to enhancing quality care and improving patient outcomes," said Alberto Esquenazi, MD, the John Otto Haas Chair of Physical Medicine and Rehabilitation. "It is also a tribute to our ongoing advances in the areas of research and technology. Our commitment in these areas provides our patients with increased hope for faster progress in recovery."

With a steadfast commitment to research, MossRehab is a teaching hospital that is the home to a world-renowned research institute dedicated to seeking out and developing new and innovative treatment and assessment tools. In addition, the hospital's comprehensive approach to rehabilitation provides an extensive repertoire of existing technology and ongoing efforts to help evaluate the best uses for new advances in science and engineering.

The *U.S. News & World Report* "Best Hospitals" rankings are designed to guide people in need of rehabilitation care by indicating those medical centers that are among the best for challenging cases and procedures. An independent, nationwide survey of physiatrists provides a ranking that helps determine the top-ranked facilities. For its "Best Rehabilitation Hospitals" rankings, this annual survey is designed to recognize the rehab hospitals with the best reputation-based scores.

"We're proud to once again rank among the best rehabilitation hospitals in the nation," said the Moss Rehabilitation Research Institute Director, John Whyte, MD, PhD. "Like many of the other fine institutions that were listed in the top ten this year, MossRehab is recognized for its ability to develop new ideas and approaches that advance patient care and quality."

MossRehab has become a preferred choice for patients with specialized treatment needs due to brain injury, spinal cord injury, stroke, amputation and a variety of other neurologic and orthopedic disorders. With inpatient, outpatient and community programs in three states, MossRehab has grown to serve patients across the greater Philadelphia region.

An important measure of MossRehab's continued success points to patient outcomes that consistently register better than the regional and national averages for most disability groups that we treat.*

According to Dr. Whyte, "Through our clinical services, advocacy and research, we continue to extend our influence into the more ambitious outcomes such as patients' overall quality of life and their increased participation in the community. We work hard to understand each patient's issues and concerns in order to explore new treatments and approaches that will optimize patient outcomes."

* Source: erehabdata.com® is a service of the American Medical Rehabilitation Providers Association. For more information, visit mossrehab.com/outcomes.

SCHOLARLY UPDATE

The members of Moss Rehabilitation Research Institute and many of our other physiatrists and therapists publish articles in leading academic journals. Some recent prominent papers include:

Jax SA, Buxbaum LJ. Response interference between functional and structural object-related actions is increased in patients with ideomotor apraxia. J Neuropsychol. April 2012.

Kim J, Whyte J, Patel S, Europa E, et al. A perfusion fMRI study of the neural correlates of sustained attention and working memory deficits in chronic traumatic brain injury. Neurorehabil Neural Repair. 2012;26:870-880.

Kim J, Whyte J, Patel S, Europa E, et al. Methylphenidate modulates sustained attention and cortical activation in survivors of traumatic brain injury: a perfusion fMRI study. Psychopharmacology. 2012;222:47-57.

Mirman D, Graziano KM. Damage to temporo-parietal cortex decreases incidental activation of thematic relations during spoken word comprehension. Neuropsychologia. 2012;50(8):1990-1997.

Lupyan G, M**irman D**, Hamilton R, Thompson-Schill SL. Categorization is modulated by transcranical direct current stimulation over left prefrontal cortex. Cognition. 2012; 124(1):36-49.

Kalénine S, **Mirman D, Buxbaum LJ**. A combination of thematic and similarity-based semantic processes confers resistance to deficit following left hemisphere stroke. Front Hum Neurosci. 2012;6:106.

Chen Q, Mirman D. Competition and cooperation among similar representations: toward a unified account of facilitative and inhibitory effects of lexical neighbors. Psychol Rev. 2012;119(2):417-430.

Giacino JT, **Whyte J**, Bagiella E, Kalmar K, et al. Placebo-controlled trial of amantadine for severe traumatic brain injury. N Engl J Med. 2012;366(9):819-826.

Whyte J, Barrett AM. Advancing the evidence base of rehabilitation treatments: a developmental approach. Arch Phys Med Rehabil. 2012;93(suppl 2):S101-S110.

Chatelle C, Majerus S, **Whyte J**, Laureys S, et al. A sensitive scale to assess nociceptive pain in patients with disorders of consciousness. J Neurol Neurosurg Psychiatry. August 2012.

Malec JF, Hammond FM, Giacino JT, **Whyte J**, et al. A structured interview to improve the reliability and psychometric integrity of the disability rating scale. Arch Phys Med Rehab. 2012;93:1603-1608.

Schwartz MF, Kimberg DY, Walker GM, **Brecher A**, Faseyitan O, **Mirman D**, et al. Neuroanatomical dissociation for taxonomic and thematic knowledge in the human brain. Proc Nat Acad Sci USA. 2011;108:8520-8524.

Dell GS, **Schwartz MF**. Who's in and who's out? Inclusion criteria, model evaluation, and the treatment of exceptions in case series. Cogn Neuropsychol. 2011;28:515-520.

Middleton EL, Schwartz MF. Errorless learning in cognitive rehabilitation: a critical review. Neuropsychol Rehabil. 2012;22:138-168.

Walker GM, **Schwartz MF**. Short form Philadelphia naming test: rationale and empirical evaluation. Am J Speech Lang Pathol. 2012;21:S140-S153.

Stiers W, Carlozzi N, Cernich A, Velozo C, Pape T, **Hart T**, et al. Measurement of social participation outcomes in the rehabilitation of veterans with traumatic brain injury. J Rehabil Res Dev. 2012;49:139-154.

Hart T, Vaccaro M, Hays C, Maiuro R. Anger self-management training for people with traumatic brain injury: a preliminary investigation. J Head Trauma Rehabil. 2012;27:113-122.

Hart T, Bagiella E. Design and implementation of clinical trials in rehabilitation research. Arch Phys Med Rehab. 2012;93 (suppl 8):S117-S126.

Hart T, Hoffman JM, Pretz C, Kennedy R, et al. A longitudinal study of major and minor depression following traumatic brain injury. Arch Phys Med Rehab. 2012;93:1343-1349.

Lee CL, Middleton EL, Mirman D, Kalénine S, **Buxbaum LJ**. Incidental and context-responsive activation of structure- and function-based action features during object identification. J Exp Psychol Hum Percept. March 2012.

Kalénine S, **Mirman D, Middleton EL, Buxbaum LJ**. Temporal dynamics of activation of thematic and functional action knowledge during conceptual processing of manipulable artifacts. J Exp Psychol Learn Mem Cog. 2012;38(5):1274-1295.

Buxbaum LJ, Dawson AM, Linsley, D. Reliability and validity of the Virtual Reality Lateralized Attention Test in assessing hemispatial neglect in right hemisphere stroke. Neuropsychology. 2012;26(4):430-441.

Torres-Oviedo G, **Vasudevan E**, Malone L, Bastian AJ. Locomotor adaptation. Prog Brain Res. 2011;191:65-74.

Jayaram G, Tang B, Pallegadda R, **Vasudevan EV**, et al. Modulating locomotor adaptation with cerebellar stimulation. J Neurophysiol. 2012;107(11):2950-2957.

Handzic I, **Barno EM, Vasudevan EV**, Reed KB. Design and pilot study of a gait-enhancing mobile shoe. Paladyn. J Behav Robotics. 2011;2(4):193-201.

Frieden R, Brar A, **Esquenazi, A, Watanabe T**. Fitting an older patient with medical comorbidities with a lower-limb prosthesis. Point–Counterpoint. PMR. January 2012; 59-64.

Zeilig G, Weingarden H, Zwecker M, Dudkiewic I, Bloch A, **Esquenazi A**. Safety and tolerance of the ReWalk™ exoskeleton suit for ambulation by people with complete spinal cord injury: A pilot study. J Spinal Cord Med. 2012;35(2):96-101.

Esquenazi A, Mayer N, Lee S, Brashear A, Elovic E, Francisco GE, Yablon S, PROS Study Group. Patient registry of outcomes in spasticity care. Amer J Phys Med Rehabil. 2012;91:729-746.

Esquenazi A, Mukul T, Andrew P, Saulino M. Exoskeleton to Restore Ambulatory Function to individuals with thoracic-level motor-complete spinal cord injury; Amer J Phys Med Rehabil. 2012;91(11):911–921.

Esquenazi, A., Packel, A. Robotic-assisted gait training and restoration. Amer J Phys Med Rehabil. 2012;91(11):S217-S231.

Esquenazi, A. Phenol neurolysis in the treatment of dystonia. In Stacey: Handbook of Dystonia-2th ed. Stacey Mark (edt). 2012;31:476-487.

Mayer N, Esquenazi A. Managing upper motorneuron muscle overactivity. In Brain Injury Medicine. N. Zasler, Katz and Zafonte (edts). DEMOS, New York, NY. 2012;50: 821-849.

Quality Improvement:
Taking Pride in Patient Safety

For many years, MossRehab has focused on quality improvement projects to enhance overall patient safety and clinical outcomes. ROQuE (pronounced Rocky) stands for Review of Outcomes and Quality for Excellence, the committee that monitors patient program effectiveness and drives quality improvement.

ROQuE continuously collects data on patient outcomes and provides department leadership with regular updates on quality improvement. As a result of these ongoing efforts, quality improvement has become a hallmark of the MossRehab commitment to care.


Julie Hensler-Cullen

"MossRehab continues to demonstrate that the improvements made by our patients exceed the improvement rates by other rehab providers—not only within our region, but also across the country," says Julie Hensler-Cullen, RN, MSN, Director of Education and Quality. "These outcome statistics speak volumes about the MossRehab commitment to care." MossRehab's ability to meet or exceed stringent accreditation standards reflects its dedication to improving quality care. The Commission on Accreditation of Rehabilitation Facilities (CARF) accredited MossRehab in 15 separate programs that extend through the end of 2014.

"The MossRehab level of care is a credit to the knowledge and expertise of our clinical staff. Our organization undergoes continuous quality improvement to meet additional accountability standards from a wide range of funding sources and referral agencies," said Ruth Lefton, Chief Operating Officer, MossRehab.

Quality improvement at MossRehab includes the use of multidisciplinary teams, quality committees such as ROQuE and a variety of technological investments. These elements encourage problem solving and lead to new treatment protocols such as clinical guidelines embedded in our electronic medical records and practical checklists.

According to Hensler-Cullen, "Improving the quality of care and increasing the percentage of positive clinical outcomes has always been a cornerstone of MossRehab standards for care. We have developed a rich and meaningful performance-improvement culture that exists throughout the institution and translates into enhanced patient safety practices and better patient care."

CAUTI Prevention: A Case in Point

The August 2012 edition of *Hospital Infection Control & Prevention* featured an article on a quality improvement project that impacts MossRehab and Einstein Healthcare Network. This patient safety project, led by Elaine Flynn RN, MSN, CIC, Infection Preventionist for MossRehab; and Karen Zombolas, System Analyst, was designed to investigate and analyze catheter-associated urinary tract infections (CAUTIs) with the goal to dramatically reduce and eventually prevent the infections.

In 2009, the urinary tract infection (UTI) team began comparing Einstein's urinary catheter practices with the guidelines and best practices published by the Society for Healthcare Epidemiology of America. With guidance from the network's chief epidemiologist, Jerry Zuckerman, MD, the UTI team tackled the challenge head-on by adopting the Plan-Do-Study-Act quality model to drive the project.

The UTI Team used the definition of a hospital-acquired CAUTI and guidelines for identifying these infections from the National Healthcare Safety Network (NHSN), an arm of the Center for Disease Control (CDC). NHSN and the CDC define CAUTI as a urinary tract infection that takes place in a patient who has an indwelling urinary catheter at the time of—or within 48 hours before—onset of signs or symptoms of the event.

In the course of medical procedures, approximately 2 million patients per year develop a healthcare-acquired infection (HAI). Urinary tract infections make up approximately 40 percent of all HAIs, and approximately 80 percent of these were CAUTIs.

Knowing that most CAUTIs are preventable, the MossRehab UTI Team became steadfastly committed to minimizing the use of indwelling catheters and reducing—and ultimately eliminating—these infections. They knew that if they could establish guidelines for the indication, a checklist for inserting and maintaining the device, and improve hand hygiene, they could significantly reduce this problem.

Setting Goals and Establishing Plans

During the first 18 months of their project, the team identified evidence-based practices for prevention and broke their mission into key areas. “The team identified nine clinical indications that were appropriate for the use of indwelling urinary catheters and developed an order set that physicians could use to identify patients and the clinical indications,” Flynn explained.

Today, when patients come to MossRehab with an indwelling urinary catheter, their initial evaluation must clearly list the date the catheter was inserted and the clinical indication for it. Nurses monitor the catheter’s use and prepare patients for its removal.

“Our goal is to not only avoid unnecessary urinary catheter insertions,” Flynn says, “but to also make sure they are used only as long as necessary. The duration of catheterization is a major factor in infection development. Each day that a urinary catheter is in place, the risk for a UTI increases.”

The team developed a nurse-driven protocol that allows nurses to remove indwelling urinary catheters that do not have appropriate clinical indications. Also, they added an embedded reminder in the electronic medical record to prompt catheter removal when no longer necessary.

Along with written guidelines, the team identified evidence-based practices, which included hand washing as the first and most important measure for preventing CAUTI. Hand hygiene is stressed throughout MossRehab and monitored for compliance using guidelines created by CDC.

According to Flynn, “Increasing awareness through best practices helps promote patient safety and provides the framework for reducing, and ultimately eliminating, the dangers associated with CAUTI.”

Further improvement came with a switch to a closed urinary catheter system that features a stabilization device. “All the pieces of the catheter system are now included in one kit,” said Flynn, “and that results in better compliance and less risk of contamination. In addition, it saves the nurses time, reduces the chance of infection, and improves patient safety. The price may have been slightly higher, but the benefits to our patients far outweighed the cost.”

Another important equipment change was adding ultrasound bladder scanners. These scanners help nurses monitor urine in the patient’s bladder once a catheter has been removed.

The final piece of this program focused on training and competency guidelines for the professionals who insert, maintain and remove catheters. Physician members of the team presented the UTI-prevention program to medical staff and residents. The nursing staff completed a course on indwelling catheter skills competency. Our guidelines, protocols and training materials were designed to help eliminate errors, improve hand hygiene and prevent infections.

Reaching Goals and Improving Outcomes

The results of this effort have been dramatic. In 2009, the mean for MossRehab’s hospital-acquired CAUTI rate was 4.32 events per 1000 indwelling urinary catheter (IUC) days. Today, that rate has been reduced 62% to a mean of 1.62 events per 1000 IUC days. In addition, the use of indwelling urinary catheters has been reduced by more than 20%.

“Our overarching goal was to improve patient safety, and the team focus was simple: put the catheter in the proper way, pay close attention to maintenance, and remove it as soon as possible.” said Flynn.

The CAUTI prevention program represents one more example of the success of the MossRehab Quality Assessment and Improvement Plan. In addition to CAUTI, focused infection prevention activities include: methicillin-resistant Staphylococus aureus (MRSA), clostridium difficile (c-diff), and central line-associated bloodstream infection (CLABSI).

With strong leadership support, dedicated staff involvement and a steadfast commitment to patient safety, MossRehab will continue to make improvements in the quality of care and reductions in adverse advents and infections.

“We work hard to make sure that the care we provide and the education we offer patients and their families will help people experience the highest quality of life post-discharge that they can possibly expect,” said Hensler-Cullen.

If you would like more information about this program, please contact Elaine Flynnn at erflynn@einstein.edu or Julie Hensler-Cullen at jhcullen@einstein.edu.

Flashback:
MossRehab Remembers the Past

Editor's note: Flashback is a new recurring feature in the newsletter that will take a quick look into the last century with a focus on rehabilitation developments from a MossRehab perspective.

Beginning in the 1980s, the American public became more aware of the value of medical rehabilitation. The work that physiatrists were doing with patients was resulting in an increase in patient functional independence and a general improvement in their quality of life. The growth of rehabilitation centers was on the rise and more PM&R residency programs were training doctors to join the ranks of the physiatric community. The demand for medical advancements and improvements in technology was fueling the change. This was a new era of challenge for physical medicine and rehabilitation.

It was in the 1980s that MossRehab established the Drucker Brain Injury Center (DBIC) for treatment of patients with traumatic brain injury. This was a decade of great change for head injury rehabilitation and marked the beginning of a period of increased public awareness for the nature and causes of head injury. DBIC stood out as one of the first centers in the country to use a functional approach to brain injury rehabilitation. Nathanial Mayer, MD founded the center and is widely regarded as a respected pioneer in the field of brain injury rehabilitation. His groundbreaking work has been emulated in many other rehabilitation facilities around the world.

The DBIC's Day Program, another first, was modeled on the type of patient-centered, self-determined approach originally used for psychiatric care. At DBIC, the Day Program promotes personal progress and encourages self-sufficiency for people living with brain injury. This patient-empowering program features work-directed activities that prepare patients to re-enter the community. Because it's built on specific patient needs and peer support, it gives patients the ability to direct the program in a way that best meets their needs and abilities. As a focus-on-abilities-first concept, every patient contributes to the overall program.

DBIC is well recognized and regarded for its brain injury treatment and research. As a world-renowned center for traumatic brain injury rehabilitation, DBIC is one of 16 federally designated Model Systems of Care and contributes significant information on traumatic brain injury care and treatment to one of the federal government's most valuable clinical programs—a national database designed to stimulate more rigorous research and improve outcomes for persons with brain injuries.

Funded by the National Institute on Disability Research and Rehabilitation (NIDRR), Model Systems of Care exist in spinal cord injury, traumatic brain injury, and burn injury. The Model Systems share information and support research in order to improve the quality of life for patients.

This decade ushered in a new generation of research activities designed to improve quality of life for people with disabilities. While MossRehab joined Einstein Healthcare Network in the 1990s, we also founded the Moss Rehabilitation Research Institute.

MossRehab opened the Motor Control Analysis Laboratory, which addresses upper extremity muscle dysfunction that occurs due to brain injury,

Dr. Mayer working with a patient in the Motor Control Analysis Laboratory

stroke or spinal cord injury; the Stroke Center, which helps patients in the recovery phase learn to regain function and reestablish community ties; and the Sheerr Gait and Motion Analysis Laboratory, which focuses on evaluating and treating gait dysfunction in patients with neuromuscular and orthopedic injuries.

In the 1990s, MossRehab was the only rehabilitation center in the region with onsite prosthetic and orthotic fabrication facilities. And in the late 1990s, MossRehab began full-service treatment of athletic-related injuries through Moss Sports Rehab.

Growing to Serve a New Century

In the first decade of the new century, the Moss Rehabilitation Research Institute moved into a new research building on the Elkins Park campus. With the introduction of the Right Hemisphere Stroke Center, MossRehab became the only U.S. facility dedicated to treating all aspects of right hemisphere stroke syndrome.

MossRehab was one of the first Stroke Centers in the nation to be accredited by the Commission for Accreditation of Rehabilitation Facilities (CARF). Along with that recognition, the Sheerr Gait and Motion Analysis Laboratory became the first in the region to be fully accredited by the Commission for Motion Laboratory Accreditation.

The skilled professionals in MossRehab's Aphasia Center are known for the quality of their research and for the successes they've achieved in individual treatment programs. Pioneering work in this area by Myrna Schwartz, PhD; Ruth Fink, MA; Adelyn Brecher, MA and others led to the introduction of MossTalk™ Words, a user-friendly computer-assisted treatment program that gives patients practice in comprehending and producing words, phrases and sentences. With key features such as multimodality cueing and feedback and automated record keeping, users can draw on a large vocabulary to customize the program. When introduced to these computer-based technology tools today, even some patients who experienced onset of aphasia years ago have achieved significant levels of recovery.

> MossRehab has emerged as a leader in the use of robotic technology in the rehabilitation continuum of care.

In addition, our research scientists have developed a variety of diagnostic tools for assessment, some of which include: MARS, the Moss Attention Rating Scale for measuring attention deficit in impaired patients (T. Hart, J. Whyte); VRLAT, the Virtual Reality Lateralized Attention Test for measuring hemi-spatial neglect after stroke (L. Buxbaum); QIBA, the Quantitative Individualized Behavioral Assessment tool for determining the state of consciousness in severe brain injury (J. Whyte); NAT, the Naturalistic Action Test for assessing disorders of complex action after brain damage (M. Schwartz, L. Buxbaum); and PNT, the Philadelphia Naming Test (short form) for assessing the nature and severity of naming disorders (M. Schwartz).

C.R. Sridhara, MD, Clinical Director of the MossRehab Electrodiagnostic Laboratory, recently developed an innovative educational DVD on the assessment of uncommon nerve entrapments. This tool has helped doctors and therapists around the world better understand techniques for evaluating and diagnosing less common nerve entrapment disorders.

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Flashback:
MossRehab Remembers the Past

Transforming Technology into Therapy

With the advent of the 21st Century, MossRehab has emerged as a leader in the use of robotic technology in the rehabilitation continuum of care. When MossRehab opened its Center for Robotic-assisted Rehabilitation in 2005, it was the first facility of its kind. The use of robotics represents one of many innovative treatment methods used by the MossRehab rehabilitation team to help patients on the road to recovery. Placing patients in a robotic environment gives the therapist greater control and reduces the risk of injuries for the patient.

MossRehab was one of the first sites in the region to introduce robotics for rehabilitation and the first U.S. site for the original trials for the Reo Therapy upper-limb robotic device. The patient sits facing a video screen and uses a robotically assisted joystick (Reo) to target images on the screen. Initially, the Reo moves the joystick and facilitates arm movement as patients attempt to achieve a target. As time goes by, the patient builds strength through repeated movement and begins to control the joystick independent of the robot.

The Center for Robotic-assisted Rehabilitation was the first site in the Mid-Atlantic region to use Lokomat, the world's first gait-driven orthotic device to feature a robotic exoskeleton mounted above a treadmill. Through robot-assisted walking therapy that uses a harness and a computer-controlled mechanical suit, Lokomat helps train the body to learn how to walk again. The device performs precise patterns of repetitive walking that are valuable in gait restoration.

MossRehab was also the first facility in the United States using the G-eo Systems Evolution, which was developed by RehaTechnology of Switzerland. This robotic device, which looks something like an elliptical machine, helps patients walk and provides the motion to train in step climbing and descending.

Introduced to clinical use in 2010, the Tibion Bionic Leg was the world's first wearable, battery-powered robotic orthosis designed for patients recovering from stroke. MossRehab was one of first facilities to use Tibion for gait retraining in the stroke and TBI population.

And, MossRehab was the first to introduce the Armeo and ArmeoPower robots. People recovering from strokes, traumatic brain and spinal cord injuries have used these robotic arm exoskeletons during their rehabilitation to aid the recovery process of their arms.

Many patients with balance disorders were first introduced to the SMART Balance Master at MossRehab. This biofeedback device measures the responsiveness and mutual cooperation between the eyes, inner ear, muscles and joints to help patients relearn balance.

Lokomat

Continuing to Make Great Strides

MossRehab's invention of the first molded plastic leg braces in the 1970s marked one of the most significant developments for the mobility impaired. Nearly 30 years later, MossRehab became the first U.S. site for clinical trials of the ReWalk device, another significant development in the form of a lightweight motorized exoskeleton suit. As one

of the first commercially feasible upright walking devices, ReWalk gives people who were once utilizing wheelchairs an opportunity to stand, walk, and, in some cases, even climb stairs.

While using crutches for stability, a patient with paraplegia can control movements using "body language" or a wireless keypad worn on the wrist. On patient command, motors at the hip and knee joints initiate the action. Sensors detect the motion and prompt the computer to issue the action that moves the leg. Before long, a patient formerly restricted to wheelchair mobility can walk across a room.

ReWalk-I

MossRehab was selected as the exclusive U.S. clinical trial site because of our international reputation for comprehensive clinical rehabilitation and research programs. MossRehab is known for its special focus on medical and cognitive rehabilitation and its ability to solve movement-based problems. The MossRehab clinical and research staff consists of some of the world's foremost experts in rehabilitation medicine, including Alberto Esquenazi, MD, Chief Medical Officer and the John Otto Haas Chair of Physical Medicine and Rehabilitation. Dr. Esquenazi played a supporting role in the development of ReWalk and his innovative leadership in rehabilitation research has helped keep MossRehab at the forefront of leading-edge therapies.

Naturally, MossRehab's ongoing goal is to decrease the time it takes to transform its research discoveries into practical clinical treatments. MossRehab is currently measuring and investigating many research initiatives in the hopes of identifying treatments to test in clinical trials. Some likely areas for greater clinical investigation include: treatments for pathological gait after stroke; treatments for skilled-action problems involving the hands; electrical stimulation-based treatments for language, movement and consciousness problems; and additional drug studies for cognitive and movement problems.

The Key to a Bright Future

Behind each era of MossRehab history, you find teams of researchers who continue to expand the horizons of scientific research. MossRehab's undeniable track record of success points to an open environment in which people are encouraged to imagine new possibilities through innovative thinking. Since no one knows where the spark of innovation may originate, MossRehab continues to search for new ways to improve patient outcomes through rehabilitation.

Day to day, patients continue to choose MossRehab for its exceptional clinical practice, its innovative research, and its inspired rehabilitative care. Whether it has been a technological breakthrough or an inventive piece of research, MossRehab has added value for the patient population it serves by sharing the knowledge and advancing the science of rehabilitation.

MossRehab Residency Alumni

Noel Rao, MD 1976-1979

Serving as Chief Medical Officer, Vice President of Medical Affairs and Director of the Residency Program at Marianjoy Rehabilitation Hospital in Wheaton, Illinois, and Professor and Chairman of the Physical Medicine and Rehabilitation Department at Rosalind Franklin University Chicago Medical School, Dr. Rao has a deep appreciation for the value of education. More importantly, he has great respect for the life lessons that can be learned during residency training, particularly those he ascertained during his training at MossRehab which prepared him for everything he does today.

While in residency, Dr. Rao shared the title of Chief Resident with his colleague, C.R. Sridhara, MD, who is currently Director of Education at MossRehab and in charge of the Temple/MossRehab Residency Training Program. “Sharing the responsibilities was a great benefit,” he said. “We learned from each other. I was good at managing time and he had great organizational skills. We both improved our administrative skills while working with Dr. Dorothea Glass, the Residency Program Director.”

Dr. Rao also remembers Thomas Strax, MD, Vice Chairman of the Department. “One day, I was invited to his office because he had learned that Dr. Sridhara and I did not want to yield to a resident’s request to postpone grand rounds,” Dr. Rao recalls fondly. “He talked to me about the importance of flexibility and dealing with change. It was a lesson I’ve never forgotten.”

In his work today, Dr. Rao is actively involved in teaching and mentoring residents. His MossRehab residency taught him the importance of a well-organized teaching curriculum that is well grounded in the clinical, academic and administrative areas. “The MossRehab program gave me the confidence to manage complicated situations and taught me how to face a difficult case,” he said. “What I learned while I was there prepared me to be a residency program director within three years of graduation.”

He understands the need for residents to learn how to manage their workload and improve efficiency. “I want my residents to have the same kind of rich clinical experience that I had,” said Dr. Rao. “I want them to gain real life experience that will help them grow and improve so that they can become excellent physiatrists.”

> **The MossRehab program gave me the confidence to manage complicated situations and taught me how to face a difficult case.**

During his MossRehab residency, Dr. Rao discovered his mentor when he began his clinical rotation in brain injury service. “Dr. Nathaniel Mayer was a great teacher and a great listener,” he said. “During his rotation, I learned how to be observant and how to listen to patients and their families. Dr. Mayer instilled great confidence in me.”

What one lesson would Dr. Rao share with anyone considering residency at MossRehab? “ Be thorough and dedicated,” he advises, “and never be afraid of hard work.”

MossRehab Residency Alumni

William Micheo, MD 1982-1985

Sometimes the right advice makes all the difference. Advice from MossRehab mentors Dorothea Glass, MD; Nathaniel Mayer, MD, Director of the Motor Control Analysis Laboratory; and Thomas Strax, MD, helped set Dr. Micheo on his personal path of discovery and success. "While attending the MossRehab residency program," said Dr. Micheo, "I learned the importance of listening to and learning from others. My mentors at MossRehab not only provided me with guidance, they also instilled in me a thirst for knowledge and an ongoing desire to improve professionally."

Dr. Micheo is Professor and Chairman, Physical Medicine, Rehabilitation and Sports Medicine Department at the University of Puerto Rico School of Medicine. He is also a past president of the American Academy of Physical Medicine & Rehabilitation. His work combines academic medicine, teaching and leadership in a private practice group that specializes in physical medicine and rehabilitation. "The wide range of training I received at MossRehab taught me that learning doesn't stop at the end of medical school or residency," said Dr. Micheo. "It's an ongoing dynamic that can be a wonderful lifelong experience."

While in the residency program at MossRehab, he was able to share his experiences with his wife, Vanessa, who at the time was training in radiation oncology at the University of Pennsylvania. "We enjoyed our time in Philadelphia and developed many friendships and professional relationships that will last a lifetime." Dr. Micheo believes the organizational, administrative and teaching experience he gained as chief resident during his final year at MossRehab began to pique his interest in a possible career in academic medicine. "It was during residency that I came to love the combination of teaching, writing, participating in clinical research and seeing patients every day." said Dr. Micheo. "I am very proud to be a MossRehab alumnus and to have trained in an institution with such a long-standing tradition of excellence."

Dr. Micheo remains active in clinical research in the areas of epidemiology of sports injury and rehabilitation of knee and shoulder injuries. He enjoys working with athletes and has been the team physician, or medical director for the Puerto Rico delegations in four Olympic games. As the Program Director of the Sports Medicine Fellowship and Coordinator of the Sports Medicine rotations for the Physical Medicine and Rehabilitation Residency Program, he sees many young, enthusiastic and smart doctors who look to him for inspiration and advice.

> **Those willing to work hard and dedicate themselves to learning and serving others will do well in any direction they choose.**

There is a common thread that runs through much of the encouragement that Dr. Micheo provides to residents. "I remind them to follow their hearts. Those willing to work hard and dedicate themselves to learning and serving others will do well in any direction they choose," said Dr. Micheo. "Those are lessons that I learned at MossRehab and now it is my turn to share that legacy."

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