

Top Ten

IN U.S. NEWS &
WORLD REPORT

65 years

OF EXCELLENCE

130+

CONFERENCE POSTERS
AND PRESENTATIONS

Advancing

THE "TRIPLE AIM"
OF REHAB CARE

Innovative

EARLY MOBILIZATION
PROGRAM



Rusk Rehabilitation

2015

YEAR IN REVIEW

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Dear Colleagues and Friends:

I'm pleased to share with you the 2015 annual report for Rusk Rehabilitation, which highlights many of our important achievements.

This year marked the 65th anniversary of Rusk Rehabilitation, founded by Howard A. Rusk, MD, as one of the country's first rehabilitation facilities, and the world's first to be affiliated with a university medical center. We are committed to Dr. Rusk's vision of utilizing the latest research and technology to improve the lives of patients, and we continue to uphold his philosophy that care must target the whole person.

Rusk Rehabilitation has played a vital leadership role in advancing PM&R in the changing landscape of healthcare. We have embraced the "triple aim" of improving the patient experience, practicing value-based medicine, and thriving amid healthcare reform. As a key participant in the bundled-payment initiative, we recognize that rehabilitation must focus on maximizing outcomes for patients in a manner that is as cost effective as possible. This year we implemented early mobilization protocols in the pediatric ICU with the aim of reducing length of stay. We also enhanced care across the cardiopulmonary continuum, providing early rehabilitation to medically complex patients and launching a pilot study that will track patient compliance after returning home. In 2015, we received a three-year recertification from the American Association of Cardiovascular and Pulmonary Rehabilitation, demonstrating that our program is aligned with guidelines for effective early outpatient care of patients with cardiac or pulmonary issues.

By instituting sweeping changes, clinically and operationally, we helped facilitate same-day discharge for patients undergoing total hip replacement, a milestone at the medical center. We also solidified our position at the NYU Langone Concussion Center, where psychologists are playing an important role in post-concussion care and researchers are developing new tools to diagnose and treat mild traumatic brain injury. A new smartphone app, developed for the Apple iPhone and Apple Watch, is being utilized in a Concussion Center research project that will allow newly diagnosed concussion patients and their doctors to monitor symptoms and track progress on a daily basis. The app will also be made available to the general public in Apple's app store.

We are growing our outpatient ambulatory services at a rapid rate and continue to expand into the outer boroughs, increasing local access to high-quality care. Through an affiliation with Lutheran Medical Center in Brooklyn, we began providing treatment for children and adults at the newly named NYU Lutheran. The site's subacute facility, the first in Rusk's expanding network, also allows us to provide patients with the very best care across the continuum.

I am proud of our dedicated faculty and staff and grateful for the supportive leadership at NYU Langone Medical Center. As the healthcare landscape continues to evolve, our clinicians will remain at the forefront of PM&R, focusing on providing the best outcomes for patients as we honor the legacy of Dr. Rusk.



A handwritten signature in black ink, reading "Steven R. Flanagan".

STEVEN R. FLANAGAN, MD

Howard A. Rusk Professor of
Rehabilitation Medicine

Chair, Department of Rehabilitation Medicine
Medical Director, Rusk Rehabilitation

Rusk Rehabilitation

CLINICAL VOLUME

190,000
clinical outpatient visits

a 12% increase compared to 2014

2,500+
inpatient discharges

1,000 cardiac and
medically complex patients

seen by Rusk's Inpatient Cardiac - Medically Complex
Rehabilitation Program since it reopened in 2013

CLINICIANS

77 certified specialists
in physical therapy

11% of all the certified specialists in New York State
are part of Rusk Rehabilitation

31 Certified Rehabilitation
Registered Nurses (CRRN)

at NYU Langone's Hospital for Joint Diseases

RESEARCH AND FUNDING

\$6.4M+
total funded research

25 active research studies

\$3.5M+
in major gifts

38 publications

AND

130+ posters
and presentations

delivered by Rusk clinicians in 2015
at national and international conferences

EDUCATION

23 PM&R chairs

around the U.S., both current and former, who have
graduated from Rusk's residency program

10,000+ downloads

Rusk Insights on Rehabilitation Medicine podcast
is available on iTunes and other podcast apps

1 of 6

ACGME accredited brain injury
physiatry fellowships

in the country. Rusk also has physiatry fellowships
in sports medicine and pediatrics

2 physical therapy residencies

- neurological rehab
- musculoskeletal, in partnership with NYU Steinhardt

ACCOLADES

Top Ten
in the country

for rehabilitation in *U.S. News & World Report's* "Best Hospitals"
since the rankings began in 1989



4 CARF-accredited
rehabilitation
programs

- Adult brain injury
- Adult inpatient
- Pediatric specialty
- Adult stroke specialty inpatient



NYU Langone Medical Center



#1

overall patient safety
& quality for
three years in a row

AND

ambulatory care quality
& accountability

among leading academic medical centers
across the nation that were included in the
University HealthSystem Consortium 2015
Quality and Accountability Study

Top 15

in *U.S. News & World Report*



#12

**BEST HOSPITALS
HONOR ROLL**



#14

**BEST MEDICAL
SCHOOLS FOR
RESEARCH**

and nationally ranked in 12 specialties,
including top 10 rankings in
Orthopedics (#5), Geriatrics (#6),
Neurology & Neurosurgery (#9),
Rheumatology (#9),
and Rehabilitation (#10)



**Tisch
Hospital**

The University Hospital
of NYU

GROWTH, INNOVATION, AND COLLABORATION

Rusk Expands Brooklyn Services

With the merger between NYU Langone and Lutheran Medical Center complete as of January 2016, Brooklyn residents will now have access to expanded adult and pediatric rehabilitation services.

NYU Lutheran Medical Center offers intensive, short-term acute rehabilitation with therapy services provided seven days a week, while NYU Lutheran Augustana Center—NYU Lutheran’s sub-acute facility—provides rehabilitation services for orthopaedic and neurological conditions. The center has had particular success with its bundling initiative, where average length of stay for joint replacement patients was reduced from 21 to 11.6 days by providing intensive physical therapy services seven days a week. Therapists also provide home care services via Lutheran Care at Home, NYU Lutheran’s certified home health agency, allowing for a seamless transition of care and the continuation of Rusk’s protocols following discharge. Outpatient adult services have further broadened too in women’s health and in vestibular rehabilitation therapy.

In addition, NYU Lutheran has expanded rehabilitation services for pediatric patients in Brooklyn, where the majority of Rusk’s pediatric population resides.

The merger will also facilitate bi-directional transfer of patients with traumatic, neurological, and orthopaedic injuries, and will lead to stronger research collaborations with a wider patient pool.



Speech-Language Pathologists Pioneering New Device

This year, Rusk’s speech-language pathology staff implemented treatment protocols for infants following congenital heart surgery, using the NTrainer System®, an FDA-approved technology that reinforces non-nutritive suck (NNS). In an upcoming study, the SLP pediatric team will partner with occupational therapists and nursing staff to create a specialized interdisciplinary feeding program in the Congenital Cardiovascular Care Unit using the NTrainer. The device, which uses rhythmic pneumatic pulsations of a pacifier-handset system, provides neuromuscular intervention to foster NNS patterns, essential for effective nipple feeding. NYU Langone is one of the only medical centers in the U.S. conducting research on the NTrainer device.

Motion Capture System Keeps Pace with Runners’ Performance and Injury

Rusk therapists recently installed the BTS SPORTLAB 3D motion capture system at the Center for Musculoskeletal Care, where it will be used to study the technique of runners, golfers, and other athletes. Data collected at the center will examine the relationship between characteristics such as pelvic drop and overstriding in runners or swing faults and sequencing issues in golfers, and the incidence of injury. Wireless sensors will also measure athletes’ levels of muscle activity, indicating whether the correct muscles are activating at the most advantageous times. The system will help clinicians develop recommendations for injury prevention and performance improvement.

▼ Charles Kim, MD, and Salvador E. Portugal, DO



New Podcast Covers Advancements in PM&R, Reaches 10,000+ Downloads

Rusk hit the digital airwaves in June 2015, launching a podcast available free on iTunes for PM&R professionals. *Rusk Insights in Rehabilitation Medicine*, which has had more than 10,000 downloads since launching, is hosted by Tom Elwood, DrPH, retired executive director of the Association of Schools of Allied Health Professions in Washington, D.C., and the author of two books on allied health. The podcast reviews a broad range of current topics through interviews with Rusk faculty and staff, including Jonathan H. Whiteson, MD, assistant professor of rehabilitation medicine and director of cardiopulmonary rehabilitation at Rusk, who discussed encephalopathy and delirium in the cardiopulmonary rehabilitation setting; Brian S. Im, MD, assistant professor of rehabilitation medicine and director of the Traumatic Brain Injury Program, who addressed the influence of cultural disparities on brain-injury rehabilitation; and Prin Amorapanth, MD, PhD, instructor of rehabilitation medicine, who is examining the use of transcranial electrical stimulation to improve emotional regulation in patients with acquired brain injuries. The show also featured live broadcasts from the American Academy of Physical Medicine and Rehabilitation (AAPM&R) annual assembly in Boston, in October.

Rusk to Play Key Role in New Spine Center

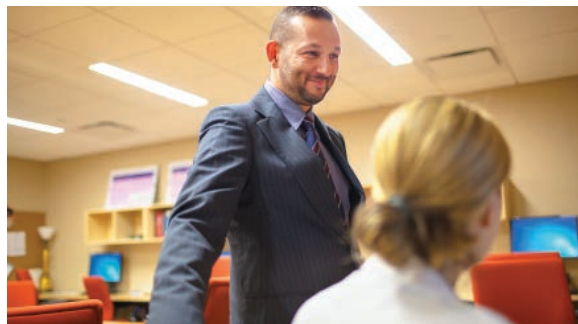
Rusk has an important part in the Spine Center at NYU Langone, which formalized a longtime surgical collaboration between its spine specialists in the Departments of Orthopaedic Surgery and Neurosurgery. The center encourages new patients to call a central number for the appropriate referral, and provides comprehensive spinal care, leveraging the skills of specialists in surgery and PM&R. Rusk physiatrists perform complete spine evaluations, discuss differential diagnoses and non-surgical management of spine pain, and inform patients of orthopaedic conditions rooted in the hip, knee, shoulder, or hand that can mimic spine-related pain. “We don’t merely assess if a patient is a candidate for surgery; we aim to maximize non-operative options first, hopefully preventing the need for surgery,” notes Salvador E. Portugal, DO, interventional physiatrist and board-certified specialist in sports medicine. Physiatrists at the Spine Center also perform numerous procedures, including radiofrequency ablation and epidural, facet, and sacroiliac joint injections.

Researchers Awarded \$1.2 Million to Study Sports-Related Concussion

NYU Langone was recently awarded a \$1.2 million Empire Clinical Research Investigator Program grant from the New York State Department of Health for a two-year study on concussion. Researchers, including Prin Amaorapanth, MD, PhD, instructor of rehabilitation medicine, hope to identify diagnostic vision-based performance measures, neuroimaging techniques, and serum markers that can capture neurologic signs and sequelae of sports-related concussion with long-term exposure to contact sports. Structural, functional, and biological markers identified in these projects may be applied across the spectrum of TBI/concussion, from acute sideline diagnosis in youth and collegiate cohorts to measurement of potential signs, in vivo, of chronic traumatic encephalopathy (CTE) among active and retired contact-sports athletes. Collection and analysis for some of the studies funded by the grant is already under way.

Camp High-Five Enhances Outcomes for Pediatric Hemiparesis

Camp High-Five, Rusk's constraint therapy program for children with neurological- or orthopaedic-rooted weakness in one arm or hand, made strides in 2015 with many enhancements. Those enhancements included: the move from a two-week to a four-week therapy camp, with the first two weeks focused on modified constraint-induced therapy and the second two weeks involving bimanual task training; a greater emphasis on home exercises at the program's conclusion; and the addition of one full-time certified occupational therapist to co-direct the camp. Concurrently, the camp's evaluation processes were modified in order to track patient outcomes and movement gains over a longer time horizon, with evaluation methods added both three and six months after the conclusion of camp. Overall, the addition of bimanual training led to greater positive changes for camp participants according to Melbourne-2 and parental assessment measures, with 67 percent of children demonstrating range of motion improvement, 89 percent demonstrating greater accuracy using their affected upper extremity, and 87 percent of parents reporting a positive change in their child's use of the affected upper extremity.



Education News: Acupuncture Track Achieves GMEC Approval

In 2015, Rusk received Graduate Medical Education Committee (GMEC) approval for an acupuncture track in its PM&R residency. The program, which started in January for third-year residents, is a collaboration with the Tri-State College of Acupuncture (TSCA). Rusk is incorporating distance learning, hands-on intensives, didactic classes, and clinics at both NYU Langone's Center for Musculoskeletal Care and the TSCA, based in Manhattan. The physician and non-physician faculty will train residents in Acupuncture Physical Medicine, an approach developed by TSCA founder Mark Seem that incorporates trigger point needling, and medical acupuncture, a style practiced by most physician acupuncturists in the U.S. "Having another tool at our disposal sometimes allows us to restore lost hope and help those for whom other treatment modalities have failed," says Alex Moroz, MD, associate professor of rehabilitation medicine and director of medical education for Rusk.

NYU LANGONE MEDICAL CENTER NEWS

Groundbreaking Face Transplant Exemplifies Expertise and Multidisciplinary Collaboration

In August 2015, surgeons at NYU Langone Medical Center performed the most complex face transplant to date. The patient, former firefighter Patrick Hardison, had lost all of the skin around his entire face, scalp and neck, including his eyelids, ears, lips, and nose, while trapped in a burning building. Led by Eduardo Rodriguez, MD, DDS, the Helen L. Kimmel Professor of Reconstructive Plastic Surgery and chair of the Hansjörg Wyss Department of Plastic Surgery, the successful 26-hour operation—the first to include transplantation of eyelids capable of blinking as well as functional ears, among other milestones—involved more than 100 physicians, nurses, and technical and support staff. More than a dozen departments contributed to the planning and execution of the procedure, or to postoperative care.

Awards & Recognition

- **Hillary Bertisch, PhD**, earned Diplomate in Clinical Neuropsychology, American Board of Professional Psychology, and was elected to Board of Directors, New York State Association of Neuropsychology.
- **Amanda Childs, PhD**, was named co-chair, Communications Committee, American Psychological Association, Division of Rehabilitation Psychology.
- **Geoffrey Hall, FACHE, MBA, LCSW**, received the 2015 Leadership Award from the Brain Injury Association of New York State.
- **Jodi Herbsman, PT, DPT**, program manager of Acute Care Rehabilitation Therapy Services, has been accepted to the Intermediate Improvement Science Series (I2S2).
- **Steven Flanagan, MD**, received an AAPM&R Outstanding Council Service Award for his work on the Central Nervous System Rehabilitation Council.
- **Joan Gold, MD**, received a lifetime achievement award from the Intimate Apparel Square Club at their annual H.U.G. Award Gala.
- **Robert Gordon, PhD**, was appointed to the editorial board of the *Journal of Infant, Child, and Adolescent Psychotherapy*.
- **Yuen Shan Christine Lee, PhD**, was selected as a leadership fellow for the Asian American Psychological Association.
- **Joseph Rath, PhD**, was appointed to the editorial boards of *The Counseling Psychologist* and the *Journal of Infant, Child, and Adolescent Psychotherapy*. He was also elected to the executive board of the Division of Rehabilitation Psychology, American Psychological Association, and received a Presidential Citation for Outstanding Service and Contribution, American Psychological Association, Division of Rehabilitation Psychology.
- **John-Ross (JR) Rizzo, MD**, was named Association of Academic Physiatrists 2015 The Electrode Store Best Paper Awards: Faculty Category Winner for his paper, "The Kinematics of Post-stroke Reaching: Understanding Motor Planning Deficits." He also received the 2015 Rising Star Award, NYC Community Service—Queens Courier Periodicals.
- **Greg Sweeney, PT, DPT, CSS**, was named president of the New York State Association for Cardiac and Pulmonary Rehabilitation.
- **Lucia Smith-Wexler, PhD**, was elected a NIDILRR ARRT Fellow for Young Investigator's Symposium at the American Congress of Rehabilitation Medicine annual meeting.

2016 Professional Education Courses Hosted by Rusk

- **AOTA Fieldwork Educator Certification Course**
February 6–7
- **Concussion Across the Spectrum of Injury: The Latest Diagnosis and Management (CME)**
February 26
- **41st Annual Comprehensive Review of Physical Medicine and Rehabilitation**
March 28 – April 2
- **Therapeutic Neuroscience Education I: Teaching People About Pain**
Featuring guest speaker, Adriaan Louw
April 2–3
- **Diagnostic and Interventional Musculoskeletal Ultrasound Symposium with Cadaver Lab**
May 19–22
- **SMT1 - High-Velocity Low Amplitude Thrust Manipulation of the Cervical, Thoracic, Lumbar and SI Joints**
Featuring guest speaker, James Dunning
May 21–22
- **Annual Course on Orthotics and Prosthetics**
June 1–3
- **McKenzie Part C - MDT: Advanced Lumbar Spine and Extremities—Lower Limb**
Featuring guest speaker, Dana Greene
June 9–12
- **Multidisciplinary Running Course**
September 30 – October 1
- **If You Can't Breathe You Can't Function**
Featuring guest speaker, Mary Massery
November 4–6

For more information, go to: nyulmc.org/cme

TRANSFORMING REHABILITATION DELIVERY IN A CHANGING HEALTHCARE ENVIRONMENT



With new clinical pathways, delivery models, and value-based medicine strategies, Rusk Rehabilitation physiatrists are positioning PM&R as a key component of the care continuum in the changing landscape of healthcare.

Expanding the Patient Benefits of Early Mobilization

EARLY MOBILIZATION

As the benefits of early patient mobilization become more widely recognized, Rusk Rehabilitation has taken steps to expand early mobilization programs within patient care units.

In 2014, the ICU Early Mobilization project, a pilot led by John Corcoran, DPT, assistant professor of rehabilitation medicine and site director, and Jonathan H. Whiteson, MD, assistant professor and director of cardiopulmonary rehabilitation, produced profound results. With therapy services implemented earlier and with greater frequency, patients were moved out of the ICU more quickly—length of stay decreased by 30 percent—and the number of patients discharged home without services increased from 18 percent to 40 percent. No adverse outcomes were reported, and estimated annualized cost savings were significant at \$2.2 million, or 29 percent. In addition, while sedation was decreased, measures of pain did not reflect an increase, allowing patients to be more engaged in their rehabilitation.

EARLY AND HIGH-FREQUENCY THERAPY FOR PEDIATRIC ICU PATIENTS

Building on this success, Rusk Rehabilitation is introducing similar early and high-frequency therapy protocols in NYU Langone's Pediatric ICU (PICU), with the aim of increasing the percent of patients mobilized in the shortest amount of time possible. "By initiating an algorithm to ensure that patients are consistently and accurately assessed for mobilization, in addition to providing education and training, we're aiming to increase therapy services early in the PICU stay while being very mindful of safety. We're applying our learnings from the ICU initiative in the pediatric setting," says Jodi Herbsman, PT, DPT, team leader for the initiative.

To address this, planning begins early. A year before starting the pilot program in the ICU, Corcoran and Dr. Whiteson met with the unit's medical director, the nurse manager, and the respiratory therapist, explaining the benefits of early mobilization and addressing questions and concerns. In the PICU, where there is the additional challenge of rightfully skeptical and cautious parents, therapists work with the medical team and nurses, and involve parents in the process, teaching them the importance of early rehabilitation. Trained parent volunteers whose children received similar therapy

are a critical part of the program. "They've been here, they know what it's like to have a child in the hospital," Corcoran adds.

As Rusk clinicians continue to research the concept of early mobilization, they are working toward determining the appropriate amount of early therapy, so patients can maximize their recovery without increased pain.

Concurrently, as the Rusk team works to answer the question of the ceiling effect of early mobilization while improving and enhancing the new programs at the ICU and PICU, plans are underway to bring the benefits of early mobilization to additional units and care programs. Early mobilization protocols will soon be implemented with critically ill patients on the medicine floor at Tisch Hospital, a move Corcoran credits to the assistant chief of medicine service, who was impressed with the program's results in the ICU. Additionally, the team is collaborating with nurses, respiratory therapists, physicians, and infection control specialists to implement the Comprehensive Unit-based Safety Program for Mechanically Ventilated Patients, which focuses on decreasing sedation, early weaning, delirium assessments, and early mobility. The respiratory department plays a key role in early mobilization, as portable ventilators expedite therapy and speed recovery by enabling patients to get out of their rooms more easily.

A RESOURCE FOR OTHERS IMPLEMENTING EARLY MOBILIZATION PROGRAMS

Rusk representatives have also been called on to share lessons learned with clinicians beyond NYU Langone by presenting specifics of their research at professional meetings throughout the year and providing advice for physiatrists around the country who seek to implement similar programs. In delivering this advice, the team emphasizes the importance of collaboration and buy-in from across the institution.

"It's rehabilitation medicine, intensive care, anesthesiology, pain management, administration—it's really multidisciplinary on many levels, and it needs to be in order to succeed," says Dr. Whiteson.

\$2.2 million

in annualized
cost savings

30%

decrease in
length of stay

Translating Stroke Rehab Research to Improved Patient Therapies

STROKE REHABILITATION

There is no better example of the way research informs care at Rusk Rehabilitation than the m² Bimanual Arm Trainer (BAT), the invention of Preeti Raghavan, MD, director of NYU Langone's Motor Recovery Research Laboratory.

Dr. Raghavan led development efforts for a range of patented motor rehabilitation devices now being used at Rusk and elsewhere.

The m² BAT is based on the principle of “mirrored motion,” which stimulates the two sides of the brain to work together to restore movement in the affected arm after a stroke. This year, the m² BAT was cleared by the FDA as a Class 1 device and is now being used by Rusk therapists in stroke rehabilitation. What makes the m² BAT special is a technological leap that uses a video game interface to provide a virtual, programmable training experience that can be individualized to the patients' stage of recovery. Furthermore, real-time feedback of the movement motivates patients to push beyond their current abilities, while the device guides them to use the right movements. Dr. Raghavan is now working with colleagues to explore the use of the m² BAT as a home-based rehabilitation tool, with treatment monitored remotely by the therapist—exciting progress toward the goal of home-based personalized telerehabilitation.

Dr. Raghavan and her team are also currently working under a prestigious 5-year R01 NIH research grant to develop innovative approaches to restore dexterous hand function. A hallmark of dexterity is the ability to quickly learn to use one's senses, such as touch, vision, and kinesthetic sense from muscles, to produce finely tuned movements and forces that are appropriate for each task. Recent results published in the *Journal of Neurophysiology* and presented at the Society for Neuroscience meeting show how the fingertip forces and muscle activity patterns are finely tuned to specific types of sensory information. Since individuals with stroke may have varying degrees of sensory impairment, these results will help understand why dexterity is impaired in a given patient and what can be done to restore it. Dr. Raghavan and her team are focusing on developing an algorithm that will inform the appropriate rehabilitation strategy for patients with different sensory impairments.

Pioneering Approaches Lead to Tangible Results

The CARF-accredited Rusk Rehabilitation stroke rehab program is an integral part of care at NYU Langone's Stroke Center, which achieved Joint Commission Certification in 2015 as a primary stroke center. The Stroke Center saw a reduction in stroke mortality by 73 percent in 2015 and was rated No. 1 for stroke mortality in the U.S. by the United HealthSystem Consortium. These achievements represent the coordinated efforts of specialists in many health disciplines, including rehabilitation medicine. For instance, in 2015 Rusk's speech language pathologists contributed to improved outcomes by developing and implementing a dysphagia screening tool to identify and prevent aspiration pneumonia.

INVESTIGATING A MULTISENSORY APPROACH TO REHABILITATION

With his team, John-Ross (J.R.) Rizzo, MD, director of the Visuomotor Integration Laboratory (VMIL) and assistant professor of rehabilitation medicine and neurology, focuses on taking a multisensory approach to stroke care. Dr. Rizzo published research on what is known as the dual-task phenomenon, where patients carry out motor and cognitive tasks simultaneously, engaging multiple sensorimotor systems. One study, which appeared in the April 2015 issue of the *Archives of Physical Medicine and Rehabilitation*, involved subjects walking while listening to emotionally salient sounds that typically demand increased attention. Dr. Rizzo and colleagues used a cognitive assessment tool known as the Blessed Dementia Scale (BDS) to grade the mental ability of subjects and found that for subjects at the upper limit of normal on the BDS (those close to cognitive impairment score cutoffs) had a slower gait speed during the dual task, as compared to healthy age-matched controls. Results from this pilot study suggest that such a dual-task assessment might be useful as a tool for screening of cognitive impairment—one that might lead to earlier and more effective interventions.

Also, Dr. Rizzo's research into how stroke affects control of eye movements may revolutionize the approach to rehabilitation after stroke. Using sophisticated camera technology, researchers record the eye movements of stroke patients in fine detail. Subjects are asked to follow targets that move around very quickly on a computer screen. The test measures saccadic eye movements, a physiologic event in which an individual quickly moves his gaze from one point of interest to another. Dr. Rizzo and his team expected to find that despite normal visual evaluations, stroke patients would have impaired saccadic eye movements. Specifically, the team hypothesized that the eye movements would be slowed. However, they found the opposite. Subjects exhibited faster initiation times of saccadic eye movements. Dr. Rizzo and the team have hypothesized that these findings suggest a disinhibition phenomenon, akin to other phenomena after stroke such as hyperreflexia and spasticity, that suggest impairment in the cortical braking system. The extent of impairment in eye movement control may reflect the state of the neural systems and inform rehabilitation strategies.



▲ Preeti Raghavan, MD, working with a research assistant on the m2 BAT device

Motor Planning: Studying Vector-Coded Reach Plans

In an effort to help stroke patients recover muscle function, therapists at Rusk Rehabilitation are conducting innovative research to study how human beings interact with objects in their environment. Past research has indicated that when planning a movement, healthy individuals take into account information about both the direction and extent of the movement, as well as the overall goal of the movement.

Rusk researchers tried to determine whether the individuals who had a stroke also incorporate both kinds of information in movement planning. They found that individuals with stroke have more difficulty planning the direction and extent of movements than with the goal of the movement. However, there were differences based on the side of the brain that had the stroke. The findings have implications for the development of personalized approaches to post-stroke rehabilitation.

Novel Ideas in the Use of Mirror Therapy

In addition to using the concept of mirror therapy for stroke patients, Rusk therapists are also exploring new applications for amputee patients. At international conferences this year, Rusk physical therapists presented research on the use of mirror therapy in the inpatient acute rehab setting for the reduction of phantom limb pain after bilateral transfemoral amputations. "There is a lot of current research about therapy for unilateral injuries," said Jennifer Eftychiou, PT, DPT. "But because the number of bilateral amputations is rising, we need a technique to reduce phantom limb pain for these patients, too. The use of mirror therapy is now part of our daily practice with patients who complain about phantom pain."

NYU Langone First in NYC to Perform Same-Day Discharge Total Hip Replacement

MUSCULOSKELETAL

Following months of preparation and coordination, NYU Langone orthopaedic and rehabilitation specialists delivered on a major milestone in 2015 with the first same-day-discharge total hip replacement in New York City.

To achieve the same-day target, Roy I. Davidovitch, MD, assistant professor of orthopaedic surgery and director of the Hip Center at NYU Langone, and the multi-disciplinary team at Rusk worked together to implement significant clinical and operational changes. As Dr. Davidovitch fine-tuned the surgical procedure involving soft-tissue-sparing techniques, performing more than 1,000 minimally invasive procedures until he achieved same-day discharge, Rusk clinicians at NYU Langone's Hospital for Joint Diseases developed a workflow initiative that streamlined rehabilitation operations. They coordinated plans for patient care with anesthesiologists, pharmacists, surgeons, social workers, and nurses in the OR and PACU, and created an online calendar that replaced team-wide emails and enabled better tracking of patients pre- and post-surgery. Clinicians also adjusted their hours, adopting a flex schedule rather than a traditional day shift. Protocols initiated during a pilot program running from January to April 2015 continue to be implemented by therapists and other members of the team.

"The success of same-day total hip replacement mostly depends on multidisciplinary logistical planning involving our physical and occupational therapists, post-op recovery and discharge nursing, as well as anesthesiologists," says Dr. Davidovitch. "Without a carefully coordinated team effort, even the best surgery in the most ideal patient will not yield the success that we have seen discharging our patients safely on day zero with zero readmissions to date."

By shifting the focus from postoperative to preoperative care, clinicians have facilitated same-day discharge for more than 55 patients who have undergone a minimally invasive anterior approach to the surgery. Though more detailed outcomes data is being tracked, the program has thus far achieved one important measure of success: None of the 55 patients have been readmitted.

PERSONALIZED PRE-OP CARE, OPTIMAL POST-OP MOBILITY

In the new protocol, therapists begin working with hip-replacement patients two weeks before surgery to expedite their recovery. They hold individualized pre-admission testing sessions in patient rooms, rather than conference rooms, to better simulate the experience for patients, and include friends or family members ("coaches") who plan to spend the night at the patient's home after surgery. Clinicians also provide hands-on instruction in the use and adjustment of ambulatory equipment that might be needed after surgery, including walkers, crutches, and canes, and offer guidance as patients rehearse postsurgical activities, from getting in and out of bed to taking a shower.

"We're still looking for ways to further fine-tune our processes and patient protocols," notes Maria Cristina Tafurt, MA, OTR/L, clinical instructor of rehabilitation medicine.

Additionally, preoperative sessions focus on helping patients—generally between 45 and 60 years old, with no history of cardiac disease—anticipate their immediate postsurgical needs after they return home, so that treatment and support services can be optimized.



▲ Kenneth Scott Young, PT

▼ Roy I. Davidovitch, MD, (left) assesses a patient's ability to walk independently prior to discharge, following a total hip replacement procedure earlier in the day



On the day of hip-replacement surgery, clinicians who conducted the original intake review all information with each patient and his or her coach. After the 60-minute procedure—which is ideally completed by 9 am—and an additional one to two hours in the PACU, patients meet with therapists to identify the most appropriate ambulatory device for discharge and to practice moving with their new hip. The day after surgery, a physical therapist and a nurse visit each patient at home. For an additional two weeks, home care agency nurses and therapists work with patients, who generally return to work within that time frame. The goal is to help patients resume all presurgery activities within six weeks.

In 2016 Rusk clinicians will work with NYU Langone's orthopaedic surgeons and others from the multidisciplinary team to increase the number of same-day hip replacement procedures and will initiate a pilot program for same-day discharge for patients having total knee replacements.

55+ patients

have been discharged the same day
as their total hip replacement at NYU Langone

New Programs and Invention Breakthroughs for Assistive Technology

ASSISTIVE TECHNOLOGY

NYU Langone's Rusk Rehabilitation has long been known for its comprehensive assistive technology (AT) services, treating a broad range of conditions that lead to challenging disabilities, including stroke, spinal cord injury, visual impairment, and neurodegenerative disease.

In 2015 the Rusk Center significantly improved its treatment abilities by creating a dedicated pediatric AT program, an important milestone in the growth of Rusk's services.

The new pediatric program expands offerings to include augmentative and alternative communication evaluations and treatments, systems for computer access, and tools that enhance the ability of pediatric patients to control their environments.

One of the exciting aspects of the new pediatric program is its inclusion of hand-held electronics and customized apps, part of a computer-based technology explosion that has revolutionized AT. "With technology so much a part of everyday life, the options for AT have improved greatly over the years I've practiced," notes Holly Cohen, OTR/L, ATP, SCEM, CDRS, assistive technology program manager. "With the maker movement, it's now even possible to make your own device using 3-D printing when something off the shelf doesn't work. That's something we'll be further exploring as well."

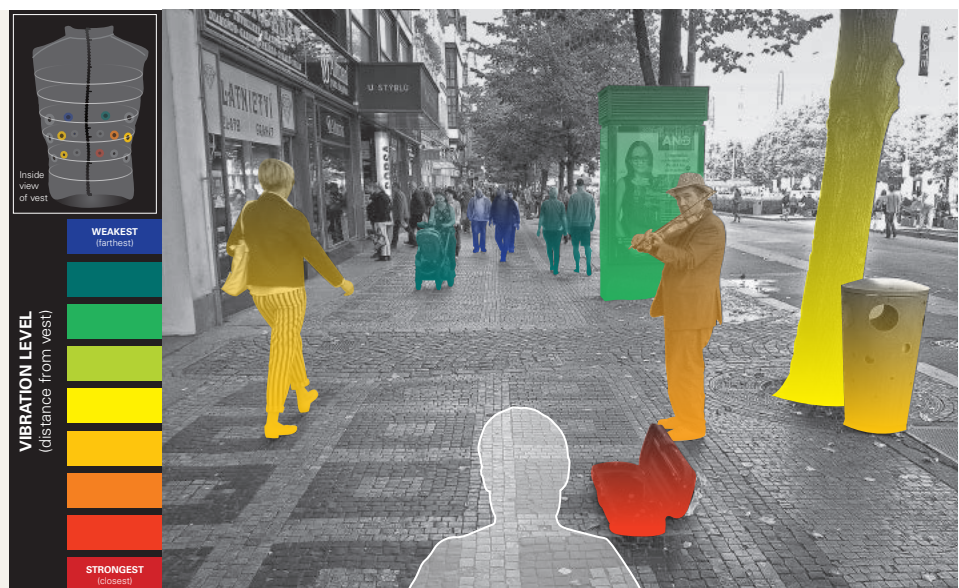
DEVELOPING INNOVATIVE SOLUTIONS FOR THE VISUALLY IMPAIRED

Rusk Rehabilitation specialists are not only pioneering the use of electronics and computer programs in assistive technology. They are also driving development of a new generation of cutting-edge AT devices.

For instance, in 2015 Rusk specialists made important advances in new AT mobility tools for the visually impaired. These advances were led by John Ross (J.R.) Rizzo, MD, director of the Visuomotor Integration Laboratory (VMIL) and assistant professor of rehabilitation medicine and neurology. Dr. Rizzo and his team are developing the "Eyeronman," a high-tech vest that uses sensors to scan the immediate surroundings, detect obstacles, and trigger vibrations that help the wearer form a 3-D vibratory image of his or her surroundings. The Eyeronman is based on the concept of biomimicry: studying the strategies that other animals use to perceive their environment and mimicking those strategies. In 2015 the project advanced to a sixth-generation prototype, used in hallway navigation while donning blindfolds.

Technological Advancements for the Visually Impaired

The Eyeronman consists of a vest outfitted with different kinds of sensors and emitters. It uses ultrasound and radio distance and ranging sensors, and the research team is experimenting with lidar, the same laser-based technology employed in driverless cars, and infrared. Input from the sensors is converted into vibrations, which are transmitted to a belt that contains a number of small, circular vibrating elements similar to a cellphone buzz. The location of the buzzes on the belt, which is centered over the belly button, corresponds to an obstacle's relative position to the wearer in space. For instance, when the user approaches an obstacle located on the lower left, it causes the lower-left part of the vest to vibrate.



Observation in Therapy Guides Medical Decision Making: Treating a Patient with Suspected Guillain-Barré Syndrome

CASE STUDY

A 77-year-old functionally independent physician with Graves' was admitted to the hospital after experiencing rapid, progressive weakness and loss of coordination, putting him at risk for serious falls. The patient's symptoms were consistent with Guillain-Barré syndrome (GBS), for which he completed a standard treatment course of IVIG, followed by physical therapy.

Notably, the patient had been taking methimazole, an antithyroid medication, to treat Graves' disease beginning three months prior to disease onset. Although GBS, a disease of immune system dysfunction, is often seen after a preceding infection, case reports have shown agranulocytosis secondary to antithyroid medication as a possible rare etiology of the disease. Although laboratory results noted normal white blood cell counts, it was noted that the initiation of this medication was a significant medical intervention.

His physicians, Jung H. Ahn, MD, clinical professor of rehabilitation medicine and medical director of inpatient rehabilitation medicine, and Jacob R. Peacock, MD, medical resident at Rusk Rehabilitation, prescribed physical therapy after a course of intravenous immune globulin in acute care, which led to mild improvement. After 19 days in acute rehab, the patient improved enough to be discharged independent with ADLs and at a wheelchair level, but he returned two days later with worsened truncal ataxia.

"The medical workup was unremarkable for a significant medical etiology of the relapsing symptoms, including concern for a possible paraneoplastic syndrome," said Dr. Peacock. "As a result, we decided to take him off methimazole with coordinated care from endocrinology. Careful cardiac monitoring and low-dose Inderal were initiated."

Drs. Ahn and Peacock worked closely with Jennifer Eftychiou, PT, DPT, and Jennifer Del Corro-Cao, PTR/L, at Rusk Rehabilitation to create a treatment plan. Over the next 27 days, the patient underwent therapy for three hours a day, five days a week focusing on trunk and lower extremity motor control, management of ataxia, and retraining in basic functions of daily living.

The overall goal of treatment was functional independence, allowing the patient to resume his normal activities at home. At the time of readmission to acute rehabilitation, the patient required maximum assistance to stand, walk, or climb stairs and scored only 6/56 on the Berg Balance Scale, a tool used to assess static balance. Within one week of stopping methimazole with continued physical therapy, his score improved to 27/56, and he was able to negotiate stairs and ambulate using a rolling walker.

The patient continued to make gains and was able to ambulate independently with the aid of a rolling walker when he returned home. At discharge, his Berg Balance score had improved to 44/56. Eventually, the patient was again started on low-dose methimazole for the risk of a potential recurrence of autoimmune hyperthyroidism.

"The patient's rapid improvement after discontinuing methimazole suggests that the medication may have contributed to the development of GBS," said Dr. Ahn. "However, further study is needed before we can establish a causal relationship."

The experience emphasizes the importance of maintaining a careful differential diagnosis and practicing team-based, patient-centric care, he added.

"Making an appropriate diagnosis in an atypical presentation of a disease is critical," Dr. Ahn said. "This case also demonstrates that interdisciplinary care is crucial in maximizing a patient's level of function."

"This case emphasized the impact of a multidisciplinary acute inpatient rehabilitation service, improving patient care and outcomes with persistent observation and direct communication between the patient's therapists and physicians."

— JUNG H. AHN, MD

Clinical professor of rehabilitation medicine and
medical director of inpatient rehabilitation medicine

Enhancing Care Across the Cardiopulmonary Continuum: From Day 0 to Post-Discharge

CARDIOPULMONARY

For patients with advanced heart failure and left ventricular assist devices (LVADs), the strength of the care continuum—from procedure through rehabilitation and after discharge—is a critical factor in determining outcomes.

Rusk Rehabilitation, known throughout New York City for its expertise in managing medically complex patients, has become a major referral center for patients requiring a full spectrum of care. “These patients tend to be older, they tend to have heart failure, and they tend to have other comorbidities, like arthritis and neuropathy. They may have had strokes in the past, but now they’ve had their valve surgery and we bring them on to the unit to rehabilitate them,” notes Jonathan H. Whiteson, MD, assistant professor of medicine and rehabilitation medicine, and director of cardiopulmonary rehabilitation.

Increasing numbers of patients at Rusk have undergone transcatheter aortic valve replacement (TAVR), an emerging surgical technique for patients with aortic stenosis who are too high risk for traditional open-heart surgery. TAVR, performed at NYU Langone by Mathew R. Williams, MD, associate professor of cardiothoracic surgery and medicine, chief of the division of Adult Cardiac Surgery, and director of Interventional Cardiology, is a minimally invasive procedure that necessitates threading a valve via a catheter through the femoral artery to replace the aortic valve. The procedure has become a reliable alternative for those with limited options for aortic valve repair; more than 200 TAVR surgeries were performed at NYU Langone in 2015, compared with 51 in 2014.

FOCUSED REHABILITATION, FROM DAY ZERO

After TAVR procedures, members of the cardiopulmonary acute care team work with the cardiac surgery team to start TAVR patients on rehabilitation as quickly as possible—often on the day of surgery, or “day zero,” to speed recovery and improve patient outcomes. Early rehabilitation is an integral part of the continuum of care that begins when patients arrive at the medical center, with a patient floor dedicated to enhanced inpatient cardiac rehabilitation.

As a major referral center for TAVR surgery, LVAD implantation, and advanced heart failure patients, NYU Langone has earned important certifications. In 2015 it was recertified for three years by the American Association of Cardiovascular and Pulmonary

Rehabilitation (AACVPR) after a peer-review accreditation process. This recognition demonstrates that the Rusk program is aligned with current AACVPR guidelines for effective and appropriate early outpatient care of patients with cardiac or pulmonary diagnoses.

TAPPING TELEMEDICINE TO TRACK PATIENTS POST-DISCHARGE

Patient adherence to discharge instructions following cardiac rehab remains a challenge, and Rusk researchers are seeking ways to help patients stay healthy at home. A new 2015 pilot program aims to extend cardiac rehabilitative care beyond Rusk’s inpatient services and 12-week outpatient program, rounding out the continuum of care with the assistance of a mobile app that uses a tele-health model. Dr. Whiteson and Tamara Bushnik, PhD, FACRM, associate professor of rehabilitation medicine and Rusk’s director of research, launched a study in September that follows patients after their 12-week outpatient rehab program has ended. The health app reminds patients to take their medication, and tracks blood pressure, weight gain, and patient compliance with post-rehabilitation instructions, using alerts to communicate information to a member of the rehabilitation team.

The program, a randomized clinical trial, will investigate whether the app helps patients remain compliant during the first six months after discharge. Individuals in the study will return for stress tests after three months, and again at six months. “We’re not just tracking usage of the app, but the patient’s physiological measures and self-reported quality of life,” says Dr. Bushnik. Researchers are also investigating the possibility of building in a peer-support component to the program, enabling patients to communicate virtually with one another as they exercise in order to improve adherence.

120 patients

enrolled in a randomized clinical trial using a mobile app to track post-rehab compliance



▲ Megan Evangelist, MS, OTR/L, with an LVAD patient involved in Rusk Rehabilitation's early mobilization program

A Model for Rehab Medicine as Leader in Concussion Research, Diagnosis, and Treatment

CONCUSSION CENTER

With concussion a growing public health concern, Rusk Rehabilitation is spearheading an effort to position PM&R as a key component of comprehensive concussion care.

At NYU Langone's Concussion Center, physiatrists often conduct first-line assessment of patients, along with their neurology and orthopaedic sports medicine counterparts. In addition, a full spectrum of rehabilitation therapists provides treatment in collaboration with specialists. "What's unique is that PM&R plays such a prominent role, which doesn't happen at a lot of other concussion centers. It's a great example of how rehabilitation medicine can position itself in this changing world of healthcare and how Rusk is leading the way," says Steven R. Flanagan, MD, the Howard A. Rusk Professor of Rehabilitation Medicine, medical director of Rusk Rehabilitation, and Concussion Center's co-director.

PSYCHOTHERAPY ENHANCES PATIENTS' RECOVERY

Increasing numbers of patients at the center are also seeing psychologists for post-concussion therapy. With mounting evidence supporting therapeutic intervention for concussion patients with lingering psychological symptoms, psychologists are playing an increasingly important role in treatment. Recently published pilot studies conducted by researchers at Rusk indicate that group therapy and psycho-education could be feasible and potentially cost-effective treatments. A study of patients with post-concussion syndrome (PCS), a condition that can include cognitive and psychological symptoms, found that the majority who attended a weekly eight-session group that included psycho-education about concussion, symptoms, recovery trajectory, and strategy use requested no further treatment after the session ended. In another study, a group of patients who attended a 14-week group therapy program that included elements of cognitive behavioral therapy (CBT) and Dialectical Behavioral Therapy (DBT) reported improvement in symptoms and emotional well-being. Symptom improvement was correlated with reported use of learned strategies.

Currently, researchers are awaiting IRB approval to enter retrospective neuropsychological data collected from other disciplines into the Concussion Center's patient registry, which will help multidisciplinary research.

NEW TOOLS TO DIAGNOSE CONCUSSION AND BETTER UNDERSTAND ITS BIOMARKERS

Additionally on the concussion research front, Rusk investigators are collaborating with their Department of Neurology colleagues to study correlations between rapid eye movements and performance on the King-Devick test, a concussion screen in which the subject is asked to read a series of irregularly spaced numbers in quick succession, to start to develop biomarkers for concussion and other brain conditions. "With a dearth of objective tools currently available to diagnose concussions, such biomarkers would represent a major step forward in characterizing this prevalent condition," says John-Ross (J.R.) Rizzo, MD, assistant professor of rehabilitation medicine and neurology. Dr. Rizzo is contributing to the research with NYU Langone neurologists Laura Balcer, MD, professor of neurology, ophthalmology, and population health, and a co-director of the Concussion Center, and Janet Rucker, MD, the Bernard A. and Charlotte Marden Associate Professor of Neurology and chief of neuro-ophthalmology.

The EyeLink research is already producing intriguing results: Early findings show that concussion appears to increase the interval between saccades—the ultrafast, jumpy movements that the eyes make as they scan a scene. "This interval incorporates fixation, duration, and saccade latency," explains Dr. Rucker. The team has submitted abstracts on their findings and has begun drafting an article for publication. They also have another paper now under review, describing their research methodology.

At the same time, NYU Langone is advancing the use of the King-Devick test and other simple, low-tech screens in the clinic and in the community. Its investigators recently published their work with local youth and college athletic teams, showing that a combination of three simple sideline tests—the King-Devick vision test; the timed tandem gait screen; and the Standardized Assessment of Concussion test, which measures memory and concentration—will detect virtually any concussion that has occurred, when compared to preseason baseline results. They also conducted a recent meta-analysis, published early last year, confirming that sideline administration of the King-Devick test can be employed productively across a wide range of age groups and geographic areas.

▼ Janef Rucker, MD, and J.R. Rizzo, MD,
using eye-tracking technology to study concussion



New Smartphone App Monitors Patient Recovery, Aids Research

The Concussion Center, in collaboration with NYU Langone's IT Department, developed an app for the Apple iPhone and Apple Watch that allows newly diagnosed concussion patients and their doctors to monitor symptoms, cognitive function, and activity levels. The NYU Langone Concussion app will track measurements on a daily basis, providing clinicians with information that can aid in assessing treatment protocols. Researchers will offer a free version of the app to concussion patients in the general public, allowing for the collection of data longitudinally and enhancing analysis of patients' recovery trajectory.

"Normally people get these tests done every week or two," notes Paul Testa, MD, assistant professor of emergency medicine and NYU Langone's chief medical information officer. "By tracking the measurements of concussion patients on a daily basis, this app and the related research project will let us assess current treatment protocols in ways not before possible."

25% increase

in Concussion Center patient volume
from 2014 to 2015

CELEBRATING 65 Years

This year, NYU Langone proudly celebrated the 65th anniversary of Rusk Rehabilitation, the world's first university-affiliated facility devoted entirely to rehabilitation medicine.

To celebrate this historic milestone, NYU Langone hosted a special Rusk Rehabilitation Research Day symposium that included lectures and technical exhibits from top experts at Rusk. Internationally renowned bionics expert Alberto Esquenazi, MD, chairman of Physical Medicine at MossRehab in Philadelphia, was honored with the Rusk Award for Innovation and Leadership to

acknowledge his contributions to the field of rehabilitation medicine. He also delivered a keynote address at the symposium on bionics. Also presenting a keynote address was renowned physical therapy expert Marilyn Moffat, DPT, program director of the NYU Steinhardt Department of Physical Therapy, who discussed PT in noncommunicable disease management.



▲ Bottom left: Rusk research leadership with Alberto Esquenazi, MD, chairman of Physical Medicine at MossRehab, who was honored with the 2015 Rusk Award for Innovation and Leadership



Howard A. Rusk, MD (1901–1989)

Howard A. Rusk, MD, a tall, soft-spoken physician from NYU Langone Medical Center and widely considered “the father of rehabilitation medicine,” set about to establish a facility founded on the belief that care should focus on the whole person—not just on their physical illness or disability, but on their emotional, psychological, and social needs. This dream became a reality with the opening of the Institute of Physical Medicine and Rehabilitation on the NYU Langone campus in 1950. Dr. Rusk’s pioneering contributions were later recognized when the Center was renamed Rusk Rehabilitation in his honor.



Academic Activities

SELECT PUBLICATIONS

Abdou A, Rizzo J, Vivaldi G, Liu J, Im B. Motor and Neurocognitive Recovery in the Syndrome of the Trephined: A Case Report. *Ann Phys Rehabil Med*.

Arenth P, Russell K, Scanlon J, Kessler L, Ricker J. Corpus callosum integrity and neuropsychological performance after traumatic brain injury: A diffusion tensor imaging study. *Journal of Head Trauma Rehabilitation*. 2014; 29(3): 313-319. PMID: 25356799.

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CONFERENCE POSTERS

7th Annual Quality and Safety Day, NYU Langone Medical Center

Smith B, Oliveri M, Du K, Cooper B, Cabrera A, Brown G, Gumbs K, Ganey-Aquino S, Balou M, Chio L, Plastrik M, Pendleton E, Barry-Walsh B. Improving patient satisfaction in an ambulatory radiation oncology department through a focus on pain management.

Smith B, Sanfilippo N, Balou M, Chio L, Plastrik M. Improving outcomes for patients undergoing radiation therapy to the head and neck—it takes a team.

9th World Congress of International Society of Physical and Rehabilitation Medicine

Bronstein F. Reducing the incidence and progression of pressure ulcers using a uniform interdisciplinary approach with visual aides in the inpatient neurological population.

Cepeda J, Gallo E, Connors K, Post M. Utilization of functional electrical stimulation to facilitate pre-running, and return to running, in a young adult male after a stroke.

Dack C, Battsek H, Matejovsky I. The challenges of neurological Lyme disease: a case study of physical therapy and a multidisciplinary approach in an outpatient setting.

Eftychiou J, Bronstein F. Use of mirror therapy for the reduction of phantom limb pain in a patient after bilateral transfemoral amputation.

75th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation

Danko J, Im B. Cognitive recovery in seronegative limbic encephalitis following benzodiazepine initiation: a case report.

Trovato E, Danko J, Im B. Acute vision loss after treatment with amantadine in the setting of traumatic brain injury in a patient with history of Fuchs' dystrophy: a case report.

Trovato E, Im B. Advocating for a patient's quality of life: a case report.

76th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation

Amorapanth P, Raghavan P, Aluru V, Aronson M, Im B, Rath J, Bilaloglu S. Physiologic mechanisms of emotional impairment in traumatic brain injury.

Rizzo J. Motor planning post-stroke: Impairment in vector-coded but not in target-coded reach plans.

Academy of Spinal Cord Injury Professionals—Educational Conference

Boudakian C, Ahn J. Severe autonomic dysreflexia triggered by hyperpyrexia: a case report.

American Academy of Orthopaedic Surgeons (AAOS)

Paksima N, O'Connell A. Flexor tendon injuries: what do we know and where do we go?

American Board of Rehabilitation Psychology APA Division of Rehabilitation Psychology Annual Conference

Childs A, Smith-Wexler L, Swencionis C, Wylie-Rosett J, Rath J. Frequency of use and perceived helpfulness of cognitive and behavioral weight-related coping strategies in a weight-loss intervention study: implications for rehabilitation.

Glubo H, McDermott H, Smith-Wexler L, Im B, Bushnik T. Disability as diversity & diversity in disability: examples from brain injury rehabilitation research.

Kim S, Childs A, Glubo H, Smith-Wexler L, Long C, Bertisch H, Lee Y, Diller L, Zemon V, Rath J. Factor Structure of the Problem Solving Inventory in Outpatients with Acquired Brain Injury.

Kim S, Zemon V, Cavallo M, Rath J, McCraty R, Foley F. Heart rate variability biofeedback, emotional regulation, and severe brain injury.

Kim S, Lee E, Stutts L, Andrews E. Redefining disability: diversity, multiculturalism, and intersectionality.

Long C, Glubo H, Lee Y, Childs A, Rath J. Development of the training, knowledge, and awareness assessment tool for transgender/gender nonconforming (TKAAT-TGNC) issues within rehabilitation psychology.

Mihovich E, Denham T, Bertisch H, Rath J. Psychological services and vestibular rehabilitation: an integrated approach.

Smith-Wexler L, Childs A, Long C, Glubo H, Kim S, Lee Y, Bertisch H, Rath J. Disordered eating, weight, and physical activity concerns in rehabilitation outpatients with acquired brain injury.

American Congress of Rehabilitation Medicine Annual Meeting (2014)

Bertisch H, Rath J, Long C, Langenbahn D, Sherr R, Ashman T, Diller L. An efficient method for assigning neurorehabilitation outpatients to treatment.

Bushnik T, Im B, Glubo H, Maystrovskaya Y. Representation in the TBI Model Systems: Reflections from an Urban Model System

Kim S, Zemon V, Cavallo M, Rath J, Sostre A, Foley F. Self-reports for individuals with severe brain injury.

Kim S, Zemon V, Picone M, Gromisch E, Rath J, Foley F. Screening for cognitive impairment in patients with multiple sclerosis: Role of patient-reported outcomes.

Long C, Verkuilen J, Rath J, Smith-Wexler L, Bertisch H, Singhroy V, Langenbahn D, Sherr R, Diller L. An item-level analysis and validation study of the problem-solving questionnaire's emotional self-regulation scale.

Lu W. Relationship between sleep architecture and symptoms of sleep disturbance in individuals with traumatic brain injury.

Mihovich E, Adams J, Denham T, Rath J. An integrative model for the treatment of co-morbid anxiety and vestibular disorder.

American Congress of Rehabilitation Medicine Annual Meeting (2015)

Eftychiou J. An Interdisciplinary Approach to Atypical Guillian-Barré Syndrome with History of Methimazole Use: A Case Report.

Windler S. An Interdisciplinary Approach to the Rehabilitation of a Patient with Balint's Syndrome: A Case Report.

American Delirium Society

Fischer M, Brown E, Evangelist M. Delirium: prevention, identification, and intervention by rehabilitation therapists in the acute care setting.

American Heart Association International Stroke Conference

Rizzo J, Hudson T, Kowal B, Wiseman W, Raghavan P. Post-stroke oculomotor abnormalities evident during objective eye-tracking but not under clinical assessment.

American Occupational Therapy Association (AOTA) Conference

Arnella K, Martori E. American sign language and motor learning of the neurological upper extremity: an evidence-based approach.

Castle K, Lim A. Finding the way to social participation after brain injury: assessments and interventions for topographical orientation.

Evangelist M, Gartenberg A. Disorders of consciousness: OT's role with collaboration from neuropsychology using the JFK coma recovery scale-revised.

Evangelist M, Gartenberg A, Dicembri A. Early occupational therapy in the intensive care unit: tools and techniques for successful practice.

Finley B. Examination of the Tenex FAST procedure for lateral epicondylitis and case study.

Finley W, Blobstein A. Examination of the Tenex FAST procedure for lateral epicondylitis and case study.

Lim A, Kalva S. Clinical reasoning behind the fabrication of a low-profile orthosis and medication use for spasticity to aid the functional recovery of a neurologically impaired upper extremity.

Smith A. Early mobilization and intervention in the pediatric intensive care unit.

American Osteopathic College of Physical Medicine and Rehabilitation Mid-Year Meeting

Burkard G, Boudakian C, Ross S, Cohen J. Bilateral above-knee amputations following compartment syndrome complicated by upper-extremity weakness and anoxic brain injury: a case report.

American Speech Language Hearing Association National Convention (2014)

Durkin A, Rabinowitz L. Cognitive impairments in Anton's Syndrome: review of two case studies.

Gurin L, Rabinowitz L, Blum S. Predictors of recovery from post-traumatic amnesia.

American Speech Language Hearing Association National Convention (2015)

Frayne C, Rabinowitz L. The effect of a transdisciplinary errorless learning protocol on severe memory impairment and disorientation following acquired brain injury—a pilot study.

Gartner-Schmidt J, Gherson S, Hapner E, Roth D, Schneider S. The development of conversation training therapy.

Haddad A. Conversion disorder—a case study.

Rabinowitz L, Chung M, Laporte A. Transdisciplinary individualized patient protocols—a pilot study in inpatient neurorehabilitation.

Singleton-Coyne M, Rabinowitz L. Can errorless learning improve orientation with patients with severe amnesia due to herpes encephalitis?

Annual Health Disparities Conference at Teachers College, Columbia University

Hada E, Long C, Smith M, Bushnik T. The influence of country of origin and attitudes towards healthcare, language preference, and health outcomes in traumatic brain injury patients.

Annual Johns Hopkins Critical Care Rehab Conference

Corcoran J, Herbsman J, Bushnik T, Dillworth J, Hall G, Parkin K, Stolfi A, Van Lew S, Joseph W, Said R, Whiteson J. Early rehabilitation in the medical and surgical intensive care unit: performance improvement project.

Annual Meeting of the National Neurotrauma Society

Myrga J, Failla M, Conley Y, Ricker J, Dixon C, Arenth P, Wagner A. Dopamine system genetics and sex interact to affect cognitive dysfunction after TBI.

APTA Combined Sections Meeting

Callahan R, Riether C. Atypical toe-walking: gait changes in a 4-year-old patient with glucose transporter type 1 deficiency syndrome after initiation of ketogenic diet.

Chan W, Battsek M. An interdisciplinary approach to rehabilitation in a patient status post cardiac surgery with a complication of a cerebral air embolism.

Chan W, Lotan D. Physical therapy management of a patient with a VAD across the continuum of care: a case series.

Coverdale A, Klein D. Measuring ataxia: use of the SARA in a patient with trapped fourth ventricle.

Dack C, Battsek H, Matejovsky I. Neurological Lyme disease: a case study of physical therapy and a multidisciplinary approach in an outpatient setting.

Eftychiou J, Bronstein F. Use of mirror therapy for the reduction of phantom limb pain in a patient after bilateral transfemoral amputation.

Erskine M. Robotic-assisted gait training s/p selective dorsal rhizotomy: a case report.

Flanzraich S, Knot K. Physical therapy treatments for Von Hippel-Lindau disease: a case report.

Gross M, Nathan A. Physical therapy management of patients with Lennox-Gastaut syndrome in the acute care setting.

Josef K. Usual versus fast gait speed of elderly inpatients prior to discharge home from the medicine service of an acute care hospital.

Kaufman R. Assessment and treatment of the thorax to treat a soccer player with lower abdominal pain.

Klein D, Coverdale A. Measuring ataxia: use of the scale for assessment of ataxia in a patient with trapped fourth ventricle.

Mounteer C, Perillo L. Acute rehabilitation of Stiff Person Syndrome: a case study.

Simon L, Nathan A. Physical therapy considerations for patients requiring extracorporeal liver support.

Stolfi A. Have we thought it completely through? How have clinical residencies and the year-long internship impacted clinical education for entry-level physical therapy students?

APTA Combined Sections Meeting

Chowansky L, Mathew J. Physical therapy intervention for surfer's myelopathy: a case report.

Knot K, Flanzraich S. Inpatient and outpatient physical therapy treatments for Von Hippel-Lindau Disease: a case report.

Unterstein A, Sumida C. Concussion rehabilitation in the pediatric patient: a case study.

Association of Academic Physiatrists

Castiglione J, Aluru V, Wiener B, Utomo P, Howard J, Herbert J, Raghavan P. Precision Grasp as a Functional Biomarker for Early Stage Multiple Sclerosis.

Chow J, Amorapanth P, Calisoff R. A Successful Outcome Involving a 25-Year-Old Female with Noonan Syndrome and Ehlers-Danlos Syndrome, Hypermobility Type, Treated in an Interdisciplinary Pain Rehabilitation Program: A Case Report.

Tabije K, Castellano J, Trovato E, Fang Q. Amyotrophic Lateral Sclerosis (ALS) in War Veteran Triggered After Being Assaulted: A Case Report.

Williams B, Freed B, Petrucelli, R. Intractable Hiccups Impeding Rehabilitation Participation and Endurance After Acute Left Dorsal and Lateral Medulla Infarct: A Case Report.

Williams B, Freed B, Ragucci, M. Rehabilitation Approach to Recurrent Left-Sided Hemiplegia Secondary to Diagnosed Conversion Disorder: A Case Report.

Williams B, Freed B, Qu S. Rehabilitation Approach and Management in Delayed Intracranial Hemorrhage after Traumatic Brain Injury in Patients with Coagulopathy: A Case Report

Association for Psychological Science Annual Convention

Hada E, Long C, Smith M, McDermott H, Bertisch H, Im B, Bushnik T. Traumatic brain injury and incarceration, recidivism, and intersectionality.

Langer K. Tracing a trace of memory: A historical view.

Academic Activities

Lorna Ramos Conference in Israel

Belfiore L. Aquatic therapy for children with brachial plexus injuries.

Kirsch S. Rehabilitation after secondary procedures and serial casting.

Kirsch S, Belfiore L. Use of neuromuscular electrical stimulation in the brachial plexus population.

Simhon L. Splinting and orthotics for infants & children with obstetric brachial plexus injury.

Simhon L. Kinesiotaping infants & children with brachial plexus injuries.

National Multicultural Conference and Summit

Glubo H, McDermott H, Smith-Wexler L, Long C, Rath J, Bushnik T. Multiple jeopardy and disparities in functional outcomes due to TBI-related disability.

National Rehabilitation Association

Donroe L, Kvaternik K, Laster B, Lindsey R, Tran A. A case study of return to work post TBI that resulted in job satisfaction and increased self-worth.

North American Brain Injury Society Annual Conference

Smith M, Hada E, Long C, Bushnik T. Examining language preference and acculturation and implications for the continuum of care for patients with traumatic brain injury.

Section on Pediatrics Annual Conference

Erskine M. Robotic-assisted gait training s/p selective dorsal rhizotomy: a case report.

Unterstein A, Sumida C. Concussion rehabilitation in the pediatric patient: a case study.

Society for Neuroscience 2015

Yousefi, A Bilaloglu S, Thai P, Aluru V, Lu Y, Rizzo JR, Raghavan P. Eye-hand coordination for adaptation of hand posture to object shaping.

PRESENTATIONS

9th World Congress of International Society of Physical and Rehabilitation Medicine

Gallo E. A case study illustrating the use of the mini-BEST for exercise prescription.

75th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation

Cohen J. Lower extremity amputations/evidence-based care and update on emerging lower extremity prosthetic technology.

Grant E, Cohen J. Rehabilitation of a patient with multiple system atrophy: a case report.

Levine J, Fusco H. Neuropharmacology: what we know and what we don't know.

76th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation

Cohen J. Pathological gait: an interactive workshop.

Fay J. Components of heart rate monitored program.

Levine J, Fusco H, Ravski E, Im B. Getting ahead of post-concussion syndrome.

Whiteson J. The triple aim—how psychiatry and the rehabilitation team can improve the patient experience and thrive within healthcare reform and value-based medicine.

1199 SEIU Stroke Conference

Levine J. New frontiers in neurostimulant use for stroke rehabilitation.

Acoustic Neuroma Society

Shea L. Cognitive issues associated with acoustic neuroma.

American Congress of Rehabilitation Medicine Annual Conference (2014)

Bushnik T. Answering the needs of people requiring rehabilitation.

Bushnik T, Im B. Incarceration and TBI.

Kingsley K. Executive functioning and hemispatial neglect.

Kingsley K. Team writing workshop.

American Congress of Rehabilitation Medicine Annual Conference (2015)

Fay J. Treating the dizzy athlete: vestibular rehabilitation after concussion.

American Occupational Therapy Association National Conference

Cirami A, Vanlew S, Waskiewicz M. Empowering and engaging today's occupational therapist for optimal work performance and job satisfaction.

American Psychological Association Rehabilitation Psychology Annual Conference

Bushnik T, McDermott H, Glubo H, Im B. Characterization of TBI rehabilitation at a New York City public hospital.

Glubo H, McDermott H, Smith-Wexler L, Im B, Bushnik T. Disability as diversity & diversity in disability: examples from brain injury rehabilitation research.

American Speech Language Hearing Association National Convention (2014)

Gherson S. Assessment & treatment of vocal fold lesions: pearls & pitfalls seminar.

Annual International Conference of Hand Therapists

Hincapie O. Rehab of focal hand dystonia in musicians: a literature review (lecture), orthoses for elbow stiffness (lecture), proprioception and sensorimotor control in the upper extremities (lecture), evaluation and treatment of proprioception in the upper extremity; the role of proprioception in osteoarthritis of the hand (lecture), evaluation and treatment of scapular dyskinesis (lecture and lab).

O'Connell A. Evaluation and treatment of the overhead athlete (lecture and lab), ASTYM technique (lecture and demo), evidence-based kinesiotaping (lecture and lab), management of elbow and wrist stiffness (lecture).

Annual New York State Athletic Trainers Conference

Colon W. Running biomechanics, injuries, and treatment (platform presentation).

Milton H. The AlterG treadmill in treatment and training (platform presentation).

Association of Academic Physiatrists

Hall G. Case Study: Culture of Mobility.

Rizzo J, Raghavan P, Hudson T. The Kinematics of Post-Stroke Reaching: Understanding Motor Planning Deficits.

Raghavan P. Stroke Rehabilitation: Thinking out of the Box.

APTA Combined Sections Meeting

Gross S, Frey C, Simon L, Harb J. Losing control: a case study of a physical therapist with acute motor axonal neuropathy variant of Guillain-Barré syndrome in the acute care setting.

Stolfi A. Development of a structure to support clinical education and facilitate staff development at a large multi-site academic medical center.

Stolfi A. Perceived challenges in clinical education: perceptions from various stakeholders.

Brain Injury Association of America

Flanagan S. Guidelines for the rehabilitation and chronic disease management of adults with moderate & severe TBI.

Brain Injury Association of Canada Annual Conference

Bushnik T, Im B. Homelessness and TBI.

Brain Injury Association of New York State Annual Conference

Denham T. Vestibular issue following brain injury.

Smith-Wexler L, Hibbard M. Managing neurobehavioral challenges.

Brain Injury Association of New York State—Monthly Chapter Meeting

Levine J. New frontiers in neurostimulant use.

Brain Injury Association of New York State, Workshop: Latest Developments in Brain Injury: Identification, Rehabilitation, and Treatment

Fusco H. A review of new technologies in the diagnosis and treatment of traumatic brain injury.

Dutch Congress of Rehabilitation Medicine

Bushnik T. Answering the needs of people requiring rehabilitation.

Fall Voice Conference

Gherson S. Benign vocal fold lesions: putting resonance to the evidence.

International Council for Caring Communities (ICCC). United Nations

Rizzo J. Creative technologies for persons with disabilities: the future is now. Tactile navigation tools assistive technology highlight.

International Lyme and Associated Diseases Society's Annual European Conference, Augsburg, Germany

Shea, L. Neuropsychological interventions with pediatric Lyme patients.

Mark P. Cilo Lectureship, Craig Hospital—Denver, Colorado

Flanagan S. Aging with TBI: chronic disease.

Flanagan S. Neuroimaging: what it tells us and what it doesn't (yet).

National Forum for Heart Disease and Stroke Prevention—Webinar

Raghavan P. Supporting world stroke day: signs, symptoms, and survivorship

National Multiple Sclerosis Society, NYC

Blacker D. Return to work considerations: identifying transferable skills.

Kvaternik K. Job-seeking skills: writing resumes.

National Traffic Injury Rehabilitation Hospital 35th Anniversary Symposium of CMC Rehabilitation Medicine, Yangpyeong, South Korea

Im B. Mild TBI and concussion.

Neurological Rehabilitation Therapy & Technology Expo

Cepeda J. Beyond independent walking in neurological rehabilitation.

New York State Pain Society Annual Meeting and Scientific Sessions

Cohen J. Complex regional pain syndrome.

NYONEL New York Organization of Nursing Executives and Leaders Conference

Desai B, Pagano E. An interprofessional early mobilization program.

Santa Clara Valley Brain Injury Conference

Im B. Role of acculturation in rehabilitation outcomes.

War-Related Illness and Injury Study Center

Rath J. Emotional self-regulation in cognitive rehabilitation for acquired brain injury.

World Rehabilitation Canton Forum, Guangzhou, China

Flanagan S. Value of rehabilitation in ICU and acute care hospitals: improving quality and decreasing costs.

Locations

as of December 2015



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By the Numbers*

NYU LANGONE MEDICAL CENTER

*Numbers represent FY15 (Sept 2014–Aug 2015)

1,069
Total Number of Beds

1,469
Full-Time Faculty

611
MD Candidates

3,800
Publications

77
Operating Rooms

1,392
Part-Time Faculty

79
MD/PhD Candidates

550,000
Square Feet of Research Space

38,554
Patient Discharges

2,627
Voluntary Faculty

272
PhD Candidates

\$178,000,000
NIH Funding

1,216,428
Hospital-Based Outpatient Visits

128
Endowed Professorships

400
Postdoctoral Fellows

\$295,000,000
Total Grant Funding

5,766
Births

2,740
Physicians

1,063
Residents and Fellows

2,900,000
Faculty Group Practice
Office Visits

3,465
Registered and Advanced
Practice Nurses

730
Allied Health Professionals

Design: Ideas On Purpose, www.ideasonpurpose.com

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