

WINTER  
2017



# WITHIN YOUR REACH

Carolinas Rehabilitation

## MOVING RESEARCH FORWARD

Inside you'll find innovative research from Carolinas Rehabilitation, part of the Carolinas HealthCare System, including new findings about depression, traumatic brain injury and sports medicine.



Carolinas HealthCare System

## FROM THE DIRECTOR'S DESK

Carolinas Rehabilitation is committed to providing world-class care to patients. As part of this commitment, we work to advance our knowledge of rehabilitation practices through research and education. In this newsletter, we share some groundbreaking work from our rehabilitation team.

In this issue, we feature two studies that have significant implications for the mental health of two specific rehabilitation populations: individuals afflicted with stroke and individuals with extracranial injuries. Furthermore, our neurological disorders team identified biomarkers in saliva that may be used in the early diagnosis of Parkinson's disease. With one case study, the cancer rehabilitation team showed how inpatient rehabilitation can improve functionality and quality of life for patients suffering from rare cancers with neurological decline. In another case study, our sports and musculoskeletal division discovered a new presentation of neurological dysfunction due to inappropriate techniques while weight lifting.

Our commitment to research – and translation of this knowledge into meaningful clinical application – remains the foundation of our work. This ability to integrate our clinical, academic and research programs defines innovation at Carolinas Rehabilitation and places us at the forefront of providing efficient and effective care. We hope you enjoy this issue of *Within Your Reach*.



Sincerely,

Vishwa S. Raj, MD  
Medical Director  
Carolinas Rehabilitation

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## SHINING A LIGHT ON DEPRESSION AMONG AFRICAN AMERICAN STROKE SURVIVORS

### A FIRST STUDY ON AN UNDERSERVED POPULATION OPENS NEW PATHS TO IMPROVED OUTCOMES

Strokes tend to hit African Americans harder than other groups. Compared with Caucasians, they have greater functional impairment on admission to rehabilitation facilities and experience more physical limitations post-rehabilitation.

Whether African Americans are also disproportionately impacted by poststroke depression (PSD) has been unclear. But thanks to a recent multicenter study conducted at Carolinas Rehabilitation in close collaboration with Duke University School of Nursing, there is now a better understanding of the prevalence of PSD among African Americans and its effect on recovery.

Published in the *Journal of Stroke and Cerebrovascular Disease*, this first study of depression and function among African American stroke survivors who received inpatient rehabilitation in the United States, revealed that 15 percent of African Americans who received rehabilitation after a stroke had documented PSD. This is lower than the estimated one-third of the general stroke survivor population. Previous estimates for African Americans ranged from 10 percent to 44 percent.

The reason for this relatively lower rate could be culture.

"African Americans typically have better family support," explains Vu Q.C. Nguyen, MD, director of the Stroke

Program at Carolinas Rehabilitation and an author of the study. "They tend to have a more extended support group, such as their neighborhood community or church, which can help patients better cope with the aftereffects of a stroke," Dr. Nguyen says.

### RESEARCH HIGHLIGHT

Depression and Functional Status Among African American Stroke Survivors in Inpatient Rehabilitation *Journal of Stroke and Cerebrovascular Disease*, January 2017

**Authors:** Gabrielle M. Harris, FNP; Janice Collins-McNeil, PhD; Qing Yang, PhD; Vu Q.C. Nguyen, MD; Mark A. Hirsch, PhD; Charles F. Rhoads III, MD, MPH; Tami Guerrier, BS; J. George Thomas, MD; Terrence M. Pugh, MD; Deanna Hamm, BS; Carol Pereira, BS; Janet Prvu Bettger, ScD, FAHA

Among the 458 African American stroke patients included in the study, there was no significant association found between depression and functional status at discharge.

However, African Americans with PSD were more functionally impaired at discharge than those without depression, supporting the need for health professionals to regularly assess patients for depression throughout recovery.

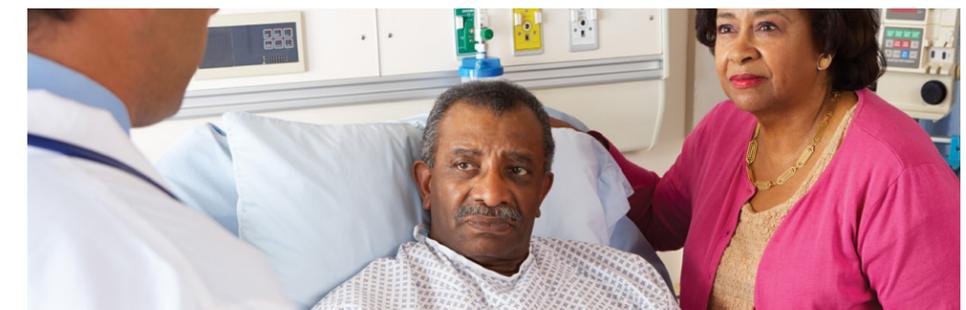
"The study does more than fill knowledge gaps around PSD and functional recovery to create a foundation for better care," Dr. Nguyen says. "It also highlights patients who have been overlooked in the past."

"Carolinas Rehabilitation is committed to pursue research on patient populations that have been historically underserved and underrepresented," says Dr. Nguyen. "This study's focus on African Americans is just one example of how we are broadening our approach to improve care for everyone."



To learn more about this study, contact Dr. Nguyen:

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## THE LINK BETWEEN TRAUMATIC BRAIN INJURY AND SUICIDALITY? IT'S NOT ALWAYS IN THE HEAD

Patients with traumatic brain injury (TBI) suffer through many challenges, including a greater risk of suicidal ideation – thinking about taking their own lives in the aftermath of the injury. But new research suggests that in cases of polytrauma where there is not only TBI but also other extracranial injuries (ECIs), a portion of that risk can be linked to having these ECIs.

Severe extracranial injuries – trauma not associated with the head – carry a nearly threefold increase in the odds of suicidal ideation after TBI. In contrast, the severity of head injury is not associated with a greater risk of attempting suicide.

These findings, recently published in the *Archives of Physical Medicine and Rehabilitation*, were the result of a collaboration among Carolinas Rehabilitation, the University of Pittsburgh and 13 other centers nationwide that use the Traumatic Brain Injury Model Systems database. With more than 3,500 participants, this study represents the type of big-data analysis that will mark the future of TBI research.

“We need to use complex research methods to find out all we can about a very complex condition that has many risk factors and potentially fatal consequences,” says Janet P. Niemeier, PhD, senior director of research at Carolinas Rehabilitation and one of the paper’s authors.

### RESEARCH HIGHLIGHT

Acute Trauma Factor Associations With Suicidality Across the First 5 Years After Traumatic Brain Injury *Archives of Physical Medicine and Rehabilitation*, August 2016

**Authors:** Matthew R. Kesinger, BA; Shannon B. Juengst, PhD; Hillary Bertisch, PhD; **Janet P. Niemeier, PhD;** Jason W. Krellman, PhD; Mary Jo Pugh, PhD; Raj G. Kumar, MPH; Jason L. Sperry, MD; Patricia M. Arenth, PhD; Jesse R. Fann, MD; Amy K. Wagner, MD

While severe ECIs were implicated in increased risk of suicidal thoughts, these injuries were not linked to a greater risk of suicidal attempts. But thoughts can lead to attempts, especially when the increased impulsivity and cognitive impairments common after TBI are also present. In general, individuals reporting



suicidal ideation are more than five times more likely to make an eventual attempt on their lives.

With self-injury the eighth leading cause of death in the United States, “it’s critical to identify at-risk populations and intervene a lot earlier, especially when other risk factors like substance abuse are involved,” says Dr. Niemeier.

Now, acute trauma physicians and orthopedic surgeons treating TBI patients who also have severe injuries, such as a fractured femur or lacerations, should be aware that their patients’ thoughts may turn to suicide. According to Dr. Niemeier, these providers can then line up appropriate inpatient consultations and follow-up care – from psychological or psychiatric consultations and interventions to pain management – to ensure those thoughts don’t turn into self-harming behavior.

To learn more about this study, contact Dr. Niemeier:

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## Serving Our Nation’s Veterans

Based on her expertise in the field of rehabilitation, Janet P. Niemeier, PhD, senior director of research at Carolinas Rehabilitation, has been congressionally appointed to the Advisory Committee on Prosthetics and Special Disabilities Programs in the Department of Veterans Affairs. This 12-member committee advises the Secretary of Veterans Affairs on state-of-the-art prosthetics and associated rehabilitation research, as well as special disability programs serving veterans.



## A GAME-CHANGING METHOD FOR IDENTIFYING PARKINSON’S DISEASE

Could the secret to early diagnosis of Parkinson’s disease be found in saliva?

That’s what a team at Carolinas Rehabilitation is investigating, hoping to identify people at risk for developing this debilitating disease years before symptoms begin.

Researchers discovered that during exercise, the brains of patients with Parkinson’s disease produce proteins that indicate the disease is getting better. These proteins act as biomarkers that show up in patients’ saliva.

These biomarkers may be especially important for diagnosing a disease that is often not detected until advanced stages. Unlike genetic testing for Parkinson’s disease, which can be expensive or take a long time, saliva-based tests can be done with just a quick swabbing of the patient’s mouth.

The study also provides some of the very first clues about what impact

exercise may have on the brains of patients with Parkinson’s disease.

### RESEARCH HIGHLIGHT

Oral Biomarkers in Exercise-Induced Neuroplasticity in Parkinson’s Disease *Oral Diseases*, November 2016

**Authors:** Jean-Luc Mougeot, PhD; **Mark A. Hirsch, PhD;** Craig B. Stevens; Farah Mougeot, PhD

“Knowing whether exercise affects disease progression gives patients living with Parkinson’s disease a greater sense of control over the disease, such as choosing to exercise, which could potentially slow, stop or reverse the progression of the disease in the brain,” says Mark A. Hirsch, PhD, director of Carolinas Physical Medicine & Rehabilitation Research Core Laboratory.

“This knowledge reduces anxiety and depression that many patients with Parkinson’s disease experience after diagnosis,” Dr. Hirsch adds.

First published in the international journal *Oral Diseases*, these findings are part of the implementation science research program of the RENEW Carolinas Parkinson’s Initiative. The RENEW program – short for Research and Education in Neuro-Wellness – empowers Parkinson’s patients with education, support and guidance, so they can live an active lifestyle and maintain or increase their independence.

Knowing that exercise may slow the disease, patients living with Parkinson’s now have one more reason to choose an active lifestyle.



To learn more about this study, contact Dr. Hirsch:

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## EVEN FOR THE RAREST CANCERS, ACUTE REHABILITATION OFFERS NEW HOPE

When a non-traumatic spinal cord injury is caused by metastatic cancer, it's often not clear what benefits rehabilitation can offer. But new research from Carolinas Rehabilitation shows how rehabilitation can play an important role in improving quality of life – even for patients facing devastating cancers.

In a case recently published in the *American Journal of Physical Medicine & Rehabilitation*, researchers described – for the first time in the rehabilitation literature – the advantages of acute inpatient rehabilitation on a patient with intramedullary spinal cord metastasis (ISCM), an exceedingly unusual consequence of leiomyosarcoma, an uncommon form of sarcoma.

The patient in this case was a 70-year-old female who presented with incomplete paraplegia, neurogenic bowel and bladder, and neuropathic pain. While she underwent radiation to treat her spinal lesion, her rehabilitation program focused on bed and wheelchair

mobility, sitting balance, transfers, bathing, dressing and catheterization.

On discharge, the patient showed improvement of bowel and bladder function and met goals for bathing and grooming. In several other domains, however, she did not make functional gains and required placement in a skilled nursing facility for continued care.

### RESEARCH HIGHLIGHT

A Rare Intramedullary Spinal Cord Metastasis from a Retroperitoneal Leiomyosarcoma Presenting as a Non-Traumatic Spinal Cord Injury *American Journal of Physical Medicine & Rehabilitation*, November 2016

**Authors:** Andrew Lamberth Parker, MD; Terrence M. Pugh, MD; Mark A. Hirsch, PhD

Although this patient did not achieve independence, a key finding of this research is that restoring quality

of life is possible for patients with terminal illnesses who receive inpatient rehabilitation.

For all such patients, a multidisciplinary team of rehabilitation specialists works collaboratively with colleagues in medical and radiation oncology and surgery to improve the performance status of their patients with metastatic cancer so they can tolerate a next round of oncological treatment. “Our role is to help patients adapt to a ‘new normal,’” says Terrence Pugh, MD, one of the patient’s physicians with Carolinas Rehabilitation and an author of the study. “We want to maximize the time they have left.”

Even when that time is concentrated, a collaborative clinical team can create an intervention that makes a real impact.

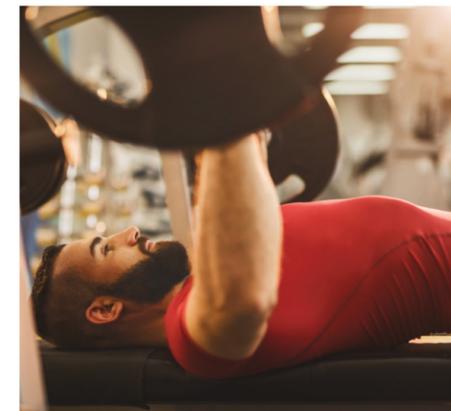


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## UNRAVELING A SPORTS MEDICINE MYSTERY

### AVOID A COMMON DIAGNOSTIC MISTAKE WITH AN UNCOMMON WEIGHT-LIFTING INJURY



### RESEARCH HIGHLIGHT

Recurrent Median Nerve Injury in a Weight Lifter *American Journal of Physical Medicine & Rehabilitation*, August 2016

**Authors:** Michael A. Worobel, DO; Bobby Alexander, MD; Mark A. Hirsch, PhD; Vu Q.C. Nguyen, MD

When a 33-year-old man referred to Carolinas Rehabilitation presented with pain and weakness in his left hand, it appeared his weight-lifting activities might be to blame.

After all, his pain was aggravated by a tight hand grip, the kind he commonly used three or four times a week at a local gym, doing multiple exercises with overhead free weights.

For the team at Carolinas Rehabilitation, this case became the opportunity to document a never-before-seen condition. For sports medicine professionals, it also serves as a reminder that proper technique is critical for preventing injury.

The diagnostic challenge was that weight-lifting peripheral injuries are relatively unusual. Additionally, thenar wasting – another complaint of the patient – is also caused by fairly common ailments such as carpal tunnel syndrome, radiculopathy or other uncommon pathological conditions such as a peripheral nerve tumor.

In fact, eight months before, this patient had presented with radicular symptoms and had complete resolution of his pain after a C7 selective nerve root block. It was originally thought this new pain might be a recurrence of his C7 radiculopathy.

The cases in this newsletter also represent the beginning of a professional journey for the lead authors, all resident physicians in the Department of Physical Medicine & Rehabilitation at Carolinas Rehabilitation.

“Mentored by faculty at Carolinas Rehabilitation, the residents were able to tap into an excellent research

network,” says Mark A. Hirsch, PhD, director of Physical Medicine & Rehabilitation Resident Research Education at Carolinas Rehabilitation. “It’s an important time for them to begin developing the research skills to continue making a contribution to the field in the future,” Dr. Hirsch says. “We need more of that in psychiatry.”

However, electrodiagnostic studies revealed a recurrent median neuropathy – but not due to overuse. The physicians concluded the injury to the recurrent median nerve was most likely caused by mechanical damage due to compression from overhead lifting of heavy weights.

The case, published in the *American Journal of Physical Medicine & Rehabilitation*, described the first time a recurrent median neuropathy had ever been associated with weight lifting.

“Clinically speaking, the importance isn’t that this injury can be caused by weight lifting. It’s that it can be caused by weight lifting in a certain manner,” says Vu Q.C. Nguyen, MD, a Carolinas Rehabilitation physician and an author of the study.

To learn more about this study, contact Dr. Nguyen:

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## A Professional Foundation Built on Research

Innovation often starts with a case study. A single observation can set the stage for advances in patient care and public policy.

mentorship network,” says Mark A. Hirsch, PhD, director of Physical Medicine & Rehabilitation Resident Research Education at Carolinas Rehabilitation.

“It’s an important time for them to begin developing the research skills to continue making a contribution to the field in the future,” Dr. Hirsch says. “We need more of that in psychiatry.”



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CAROLINAS REHABILITATION

# WITHIN YOUR REACH

Carolinas Rehabilitation is one of the largest rehabilitation providers in the nation. As part of Carolinas HealthCare System, Carolinas Rehabilitation sets national and international standards of care, develops proven tactics that improve patient outcomes and helps hospitals and providers navigate complex care delivery.

## Carolinas Rehabilitation:

- Boasts the world's first CARF-accredited cancer rehabilitation program
- Operates 10 other CARF-accredited programs
- Has 4 inpatient hospitals and more than 20 outpatient locations
- Serves roughly 24,000 patients each year with a network of 23 doctors
- Provides comprehensive residency training with more than 70 residents since 2000

