

# reConnections

JOURNAL FOR WAKEMED REHAB



## Taking New Steps with Technology

TECHNOLOGY'S IMPACT  
ON SPEECH THERAPY

5 ROBOTIC DEVICES  
'LENDING A HAND'

A WALK TO REMEMBER





James Farago OT/AT  
OT

### Control System

Emergency Stop

Tray Position Normal  
Tray Range Unlocked

Dynamic Unloading

Fall Prevention

Speed: 0.0 mph

Distance: 24.4 ft

Uploading: 12 lbs  
5% (of weight)

Falls: 0

Position: 2.0 in

Time: 00:13:18

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## LETTER FROM THE EXECUTIVE DIRECTOR

**A**s technology has evolved, so has the way we use it – the health care industry is no exception. At WakeMed Rehabilitation, our use of evidence-based rehabilitation technologies and innovative therapies are allowing us to maximize recovery and produce the best results for our patients as they prepare for re-entry into the community.

From functional electrical stimulation to assistive and wearable robotics to gamification and virtual reality, technology is shaping the way our therapists evaluate, treat and enable our patients to achieve their goals in ways not possible with traditional “tried and true” industry standards. At the same time, this technology is empowering our patients to regain functionality, mobility, strength and hope they otherwise would never get back.

By integrating these advanced technologies into our programs, we are meeting the unique and specific rehabilitation needs of people recovering from traumatic brain injury, stroke, spinal cord injury, amputation, orthopaedics and more.



We are so grateful to WakeMed Administration and the WakeMed Foundation for supporting our advanced technology programs that not only provide the equipment, but also the specialized training and certifications for our clinical teams.

We're excited about the different rehabilitation technologies that are consistently being added to our programs to make rehab more accurate, insightful, engaging and accessible, and we hope you are too!

Please enjoy this edition of reConnections highlighting our commitment to providing more personalized and effective care to our community.

A handwritten signature in black ink that reads "Elaine Rohlik".

ELAINE ROHLIK, PHD, MSW  
Executive Director,  
WakeMed Rehabilitation Services

## reConnections

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### Supporting WakeMed Rehab

The WakeMed Foundation welcomes contributions to benefit the programs and services of WakeMed Rehab. To learn how you can support WakeMed Rehab, please visit the WakeMed Foundation at [www.wakemedfoundation.org](http://www.wakemedfoundation.org) or call 919-350-7656.

# WAKEMED REHABILITATION LOCATIONS

*We offer a variety of rehab services and programs with convenient locations throughout Wake County and in Clayton.*

## **INPATIENT**

**WakeMed Rehabilitation Hospital**  
3000 New Bern Avenue  
Raleigh, NC 27610  
919-350-7876

## **OUTPATIENT**

Please call 919-350-7000 for  
WakeMed Outpatient Rehab  
scheduling

**WakeMed Outpatient Rehab –  
Raleigh**  
3000 New Bern Avenue  
Raleigh, NC 27610

**WakeMed Outpatient Rehab –  
Raleigh Medical Park**  
23 Sunnybrook Road, Ste. 300  
Raleigh, NC 27610

**WakeMed Physical Therapy –  
Oberlin**  
505 Oberlin Road, Ste. 140  
Raleigh, NC 27605

**WakeMed Physical Therapy –  
Brier Creek**  
7901 TW Alexander Drive, Ste. 500  
Raleigh, NC 27617

**WakeMed Outpatient Rehab –  
Durant Road**  
10880 Durant Road, Ste. 302  
Raleigh, NC 27614

**WakeMed Outpatient Rehab –  
Cary**  
110 Kildaire Park Drive, Ste. 201  
Cary, NC 27518

**WakeMed Physical Therapy –  
Cary**  
110 Kildaire Park Drive, Ste. 208  
Cary, NC 27518

**WakeMed Outpatient Neuro  
Rehab – Cary**  
110 Kildaire Park Drive, Ste. 401  
Cary, NC 27518

**WakeMed Outpatient Specialty  
Rehab – Cary Hospital**  
1900 Kildaire Farm Road  
Cary, NC 27518

**WakeMed Physical Therapy –  
Pelvic Health - Cary**  
210 Ashville Avenue  
Cary, NC 27518

**WakeMed Physical Therapy –  
Cambridge Village - Apex**  
10000 Cambridge Village Loop  
Apex, NC 27502

**WakeMed Outpatient Rehab –  
Clayton**  
104 Medspring Drive, Ste. 210  
Clayton, NC 27520

## **CARDIAC REHAB**

WakeMed Raleigh Campus and  
Kildaire Park Drive outpatient  
rehab locations

## **PULMONARY REHAB & COVID-19 RECOVERY**

WakeMed Raleigh Campus and  
Kildaire Park Drive outpatient  
rehab locations

## **HEALTHWORKS FITNESS & WELLNESS**

WakeMed Raleigh Campus and  
Kildaire Park Drive locations

## **OUTPATIENT WOUND CARE**

Please call 919-350-4515 for  
WakeMed Wound Care scheduling

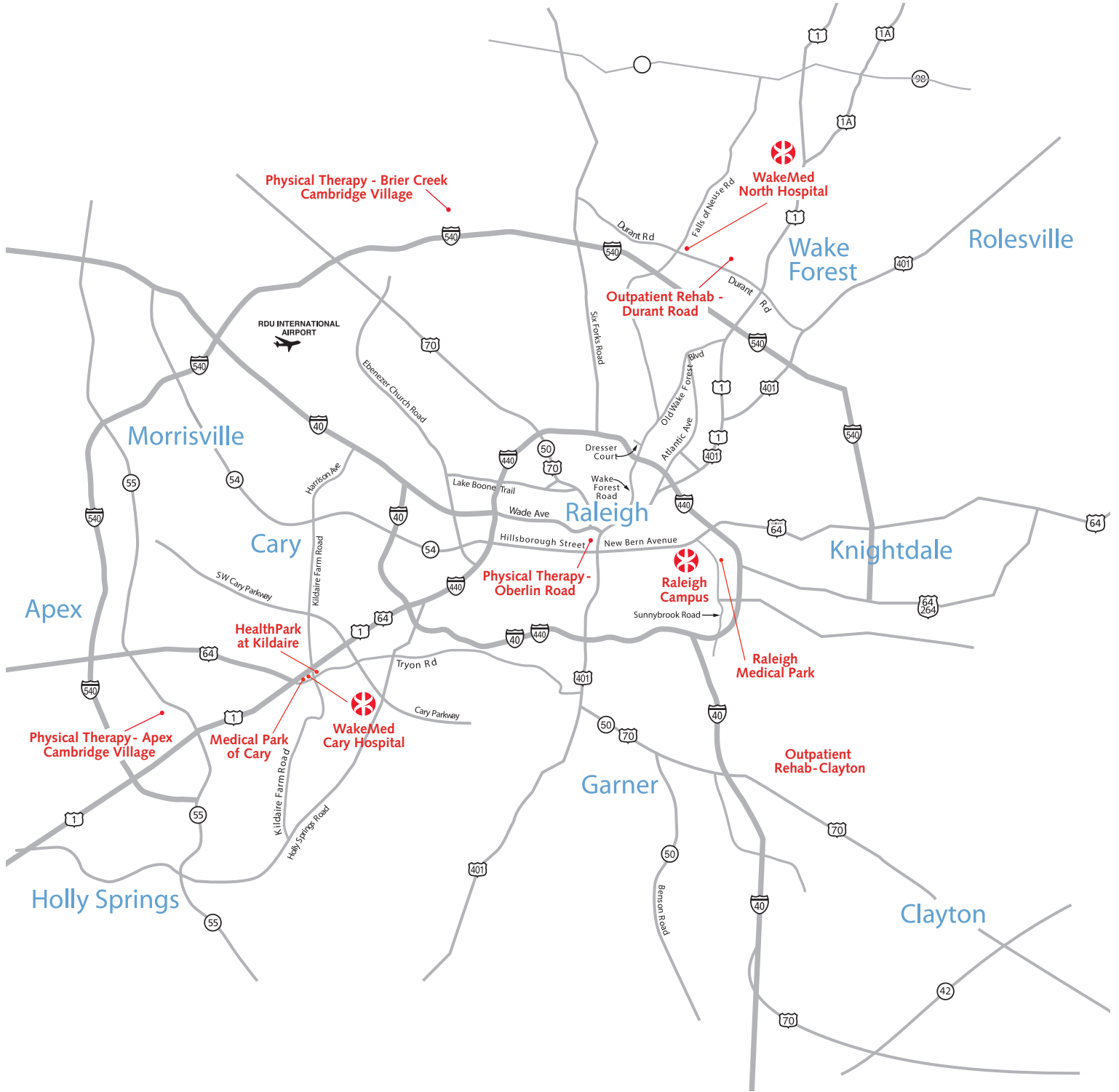
**WakeMed Wound Care – Raleigh**  
3000 New Bern Avenue  
Raleigh, NC 27610

**WakeMed Wound Care – Cary**  
210 Ashville Avenue, Ste. 420  
Cary, NC 27518

## **HOME HEALTH**

**WakeMed Home Health**  
2920 Highwoods Boulevard  
Raleigh, NC 27604  
919-350-7990





Clayton, Raleigh Campus and Raleigh Medical Park locations operate as a hospital-based service under the license of WakeMed Raleigh Campus. WakeMed Outpatient Specialty Rehab, WakeMed Outpatient Rehab – Cary and WakeMed Outpatient Neuro Rehab – Cary operate as a hospital-based service under the license of WakeMed Cary Hospital. The WakeMed Physical Therapy practices operate as private practices.



# Rehab Technology Offers New Hope for Feeding, Swallowing and Communication Difficulties

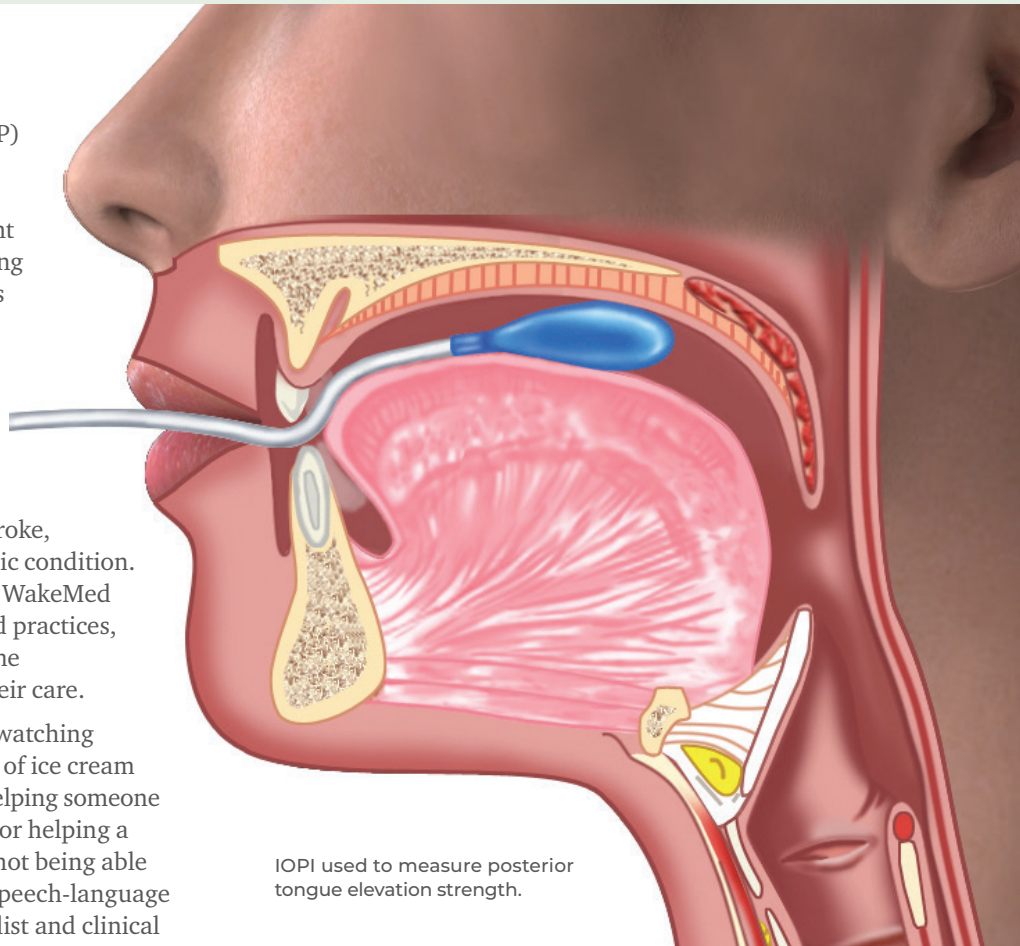
**S**peech-language pathology (SLP) programs have transformed over the years with new features and capabilities brought on by advanced technology. Using this technology, WakeMed Rehabilitation's SLP program is helping patients regain communication, cognition and swallowing skills critical to their safety and independence.

While many take eating, drinking and speaking for granted, these critical skills are commonly lost or impaired after a stroke, traumatic brain injury or other neurologic condition. The dedicated, interdisciplinary team at WakeMed Rehab employs the latest evidence-based practices, therapies and rehab technologies to get the best possible outcomes for patients in their care.

“There is nothing more rewarding than watching someone take their first sip of tea or bite of ice cream after weeks of being on a feeding tube, helping someone remember their grandchildren’s names, or helping a person tell their family ‘I love you’ after not being able to speak for weeks,” says Haley Root, a speech-language pathologist, certified brain injury specialist and clinical specialist at WakeMed Rehab.

The speech therapy team secured funding from the WakeMed Foundation to equip the department with iPads to allow device-based interactive therapy in receptive and expressive language, cognition, augmentative and alternative communication (ACC) practice, and voice exercises. The tablets also act as a training and demonstration tool for patients to download apps on their personal smart devices for continued home practice to help them meet their goals outside of clinic treatment sessions.

Beyond assistive technology, WakeMed’s SLP program also utilizes two other promising technologies – the Iowa Oral Performance Instrument (IOPI®) and the Guardian®



IOPI used to measure posterior tongue elevation strength.

Aspire2 SwallowStim – to augment patient care.

“Technology has really been beneficial to help guide our practice by allowing us to objectively measure progress and provide motivation and patient buy-in through bio-feedback to help patients meet their goals,” says Root.

## Iowa Oral Performance Instrument (IOPI)

The IOPI uses an air-filled bulb to measure the strength and endurance of a patient’s tongue and lips. By comparing a patient’s IOPI data to the benchmarks of normal functioning for their age, speech-language pathologists can develop an exercise program to strengthen the muscles in the mouth and improve outcomes for swallowing



problems. After taking these initial measurements, the IOPI bulb can then be used as a therapy tool, offering resistance during strength-building oral exercises. “The muscles of the mouth are so imperative in the safety and efficiency of chewing and swallowing and are commonly affected by neurological injuries. The IOPI device not only provides biofeedback to the patient to improve motivation, but also allows them to see their progress in oral strength,” says Root.

### Guardian Aspire2 SwallowStim

Guardian Aspire2 SwallowStim neuromuscular electrical system (NMES) and surface electromyography (sEMG) biofeedback device is an advanced and interactive tool to treat swallowing problems, also called dysphagia. According to the National Foundation of Swallowing Disorders, dysphagia affects 15 million Americans each year and can be caused by a wide range of conditions, including stroke, Alzheimer’s disease, Parkinson’s disease, cancers of the head and neck, multiple sclerosis and ALS.

Patients with moderate to severe dysphagia may need a feeding tube or modified diet due to muscle weakness, decreased sensation or difficulty with motor planning, affecting their ability to swallow safely. But Guardian's Aspire2 SwallowStim device can help.

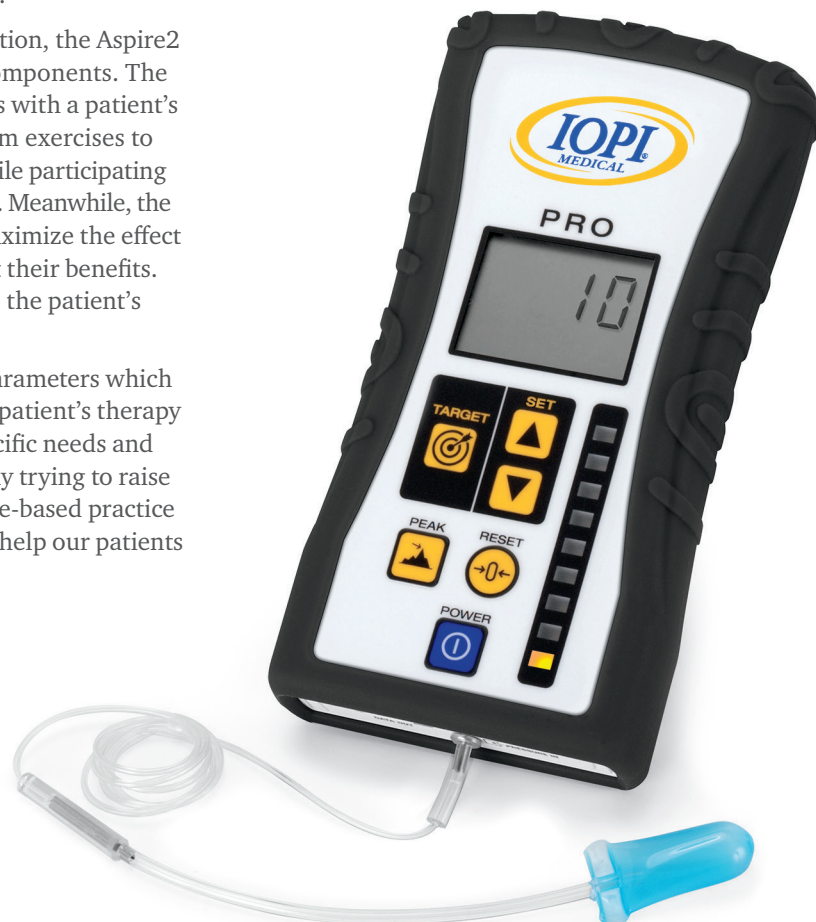
Also funded by the WakeMed Foundation, the Aspire2 device uses both sEMG and NMES components. The sEMG provides biofeedback and syncs with a patient’s personal smart device so they perform exercises to improve their swallowing function while participating in goal-directed game-like programs. Meanwhile, the NMES uses electrical stimulation to maximize the effect of the swallowing exercises and boost their benefits. Both components are customizable to the patient’s unique needs.

“The Aspire2 device has adjustable parameters which really allows us to individualize each patient’s therapy sessions and goals based on their specific needs and deficits,” says Root. “We are constantly trying to raise the bar and stay current with evidence-based practice to ensure we have the best options to help our patients recover.”

From assistive technology such as iPads to help patients communicate, to tongue strengthening devices, and NMES and sEMG technology to help retrain the muscles involved in swallowing, the opportunities for patient success abound when coupled with traditional speech therapy. These advanced treatment options are just a few examples of how WakeMed Rehab is using advanced technology to help SLP patients communicate more effectively with others, develop safe and effective swallowing patterns, and engage with their communities more easily.

*“We are constantly trying to raise the bar and stay current with evidence-based practice to ensure we have the best options to help our patients recover.”*

— Haley Root,  
MS, CCC-SLP, CBIS





# 5 Robotic Devices *‘Lending a Hand’* in Upper Extremity Rehab

**P**atients are improving movement in their arms and hands post-injury or neurological event thanks to breakthroughs in technology and the dedicated care of WakeMed Rehab.

WakeMed’s Rehabilitation Hospital and Outpatient Rehab programs work with patients with a wide range of arm and hand mobility issues, including neurological impairments and limb loss. The team uses a holistic and interdisciplinary approach, combining physical therapy, neuropsychology, occupational therapy, speech-language pathology and physiatry, along with leading-edge technology, to achieve the best possible outcomes for patients.

Amber Lewis is an occupational therapist and a supervisor with Outpatient Rehab Services at WakeMed.

“Our program is comprehensive and offers many tools to help meet our patients’ needs and to maximize their functional outcomes,” she says. “We skillfully blend the use of technology, manual skills and aquatic therapy to help with a patient’s upper extremity recovery.”

Lewis explains that technology has redefined the care that therapists can offer patients, while also providing patients useful feedback to keep them motivated in their recovery. Even in cases where a patient’s movement is severely limited, technology allows them to see incremental improvements, which can build to more meaningful gains over time.

“In a 30- to 40-minute session with the InMotion ARM device, for example, we can capture data on 500-plus movement repetitions, which is nearly impossible for a therapist to produce on their own,” Lewis says. This type of technology also allows patients to be more motivated in completing their home exercise program.

“Technology has allowed us to provide care to patients that, 15 years ago, would have been discharged,” Lewis continues. “This technology allows us to work on multiple areas of the body at once and provides the patient with higher quality repetitions of movements, which promotes neuroplasticity.”



Patient using SeaboFlex to improve hand functionality.

Neuroplasticity is the brain’s way of rewiring itself and is a key component of rehabilitation. Lewis is extremely passionate about this aspect of rehab and its potential to transform patients’ lives.

“I am fascinated and humbled to know I can have an impact on the rewiring of a patient’s brain. I enjoy seeing the changes and improvements and rejoice with them when we accomplish any forward progression. Many of our patients are able to return to work and school. I love being a part of restoring a patient back to their life roles and reintegration into the community,” she says.

There are five exciting technological devices used in WakeMed’s upper extremity rehab program. Let’s take a closer look at each of them:



## 1. Bionik InMotion® ARM

InMotion's robotic arm device optimizes evidence-based neurorehabilitation technology to measure, monitor and, when needed, support arm and hand movements through high-repetition activities. It enhances the therapist's ability to drive repetition and neuroplasticity, helping to restore motor function and improve outcomes for patients. It's suitable for most neurological impairments and gives therapists a lot of flexibility for customizing sessions to a patient's needs.

## 2. Bioness H200 Wireless Hand Rehabilitation System

The Bioness H200 is an ergonomically designed, easy-to-operate system that helps patients with the grasping and releasing functions of the hand and arm. It uses functional electrical stimulation (FES) in the flexor and extensor muscles of the forearms to assist patients with opening and closing their hands and fingers. By helping improve movement in arms and hands, the Bioness keeps muscles active, reducing swelling and stiffness. It's designed for patients with neurological impairments and offers the freedom and convenience of wireless operation to help restore their ability to perform ordinary and essential activities of daily living.

## 3. SaebFlex and SaebGlove

The SaebFlex and SaebGlove live up to their motto: "No plateau in sight." These devices also help patients open and close their hands and fingers to grasp and release objects. They are designed for patients with moderate to severe spasticity, or unusual muscle tightness caused by certain neurological conditions. They are also approved for home use and help maintain the arm and hand's optimal positions for functioning.

WakeMed occupational therapist working with patient using the Bionik InMotion ARM.

*"Technology has allowed us to provide care to patients that, 15 years ago, would have been discharged."*

— Amber Lewis,  
OTR/L, MHA/MSL, CBIS, CSRS

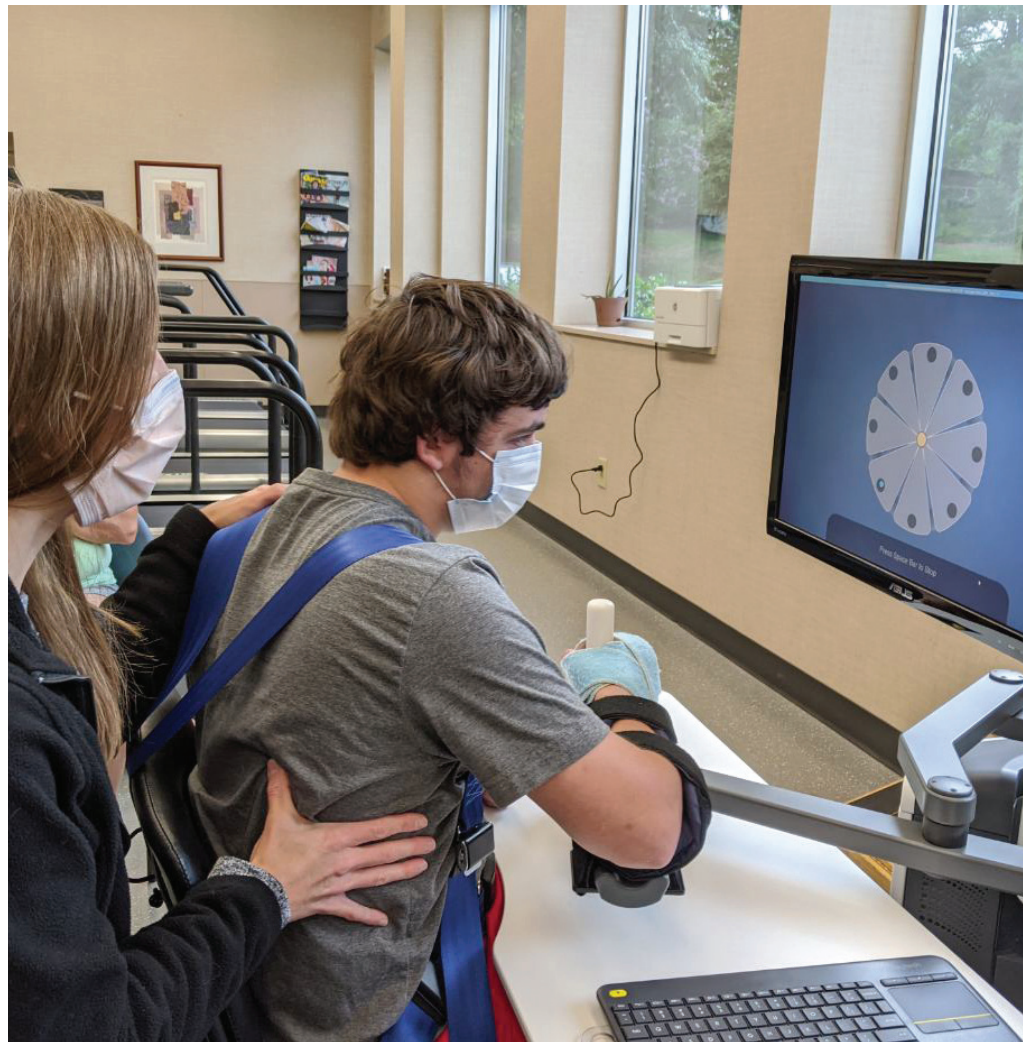
## 4. Xcite

The Xcite is a portable system that offers patients easy-to-use, pre-programmed activities for performing tasks, strengthening hand and arm muscles, and supporting gross motor functioning. Through 12 different channels of electrical stimulation, the Xcite can boost neuroplasticity, improve circulation in the muscles, maintain or increase range of motion, and reduce spasticity. It integrates seamlessly into traditional physical and occupational therapy practices and can be used in clinics or at home.

## 5. RT300 FES Cycle

The RT300 cycle combines motor assistance/resistance activities with integrated functional electrical stimulation to assist in muscle contraction and functional movement. The bike can combine arm and hand exercises with leg activities to boost patients' overall mobility skills. It is ideal for any patient with paralysis, muscle weakness or other neurological extremity impairment.

*Many of these innovative technologies have been made possible through funding provided by the WakeMed Foundation, WakeMed's philanthropic partner.*





# TAKING NEW STEPS WITH TECHNOLOGY

**A**t WakeMed Rehabilitation Hospital, therapeutic technologies have become an integral part of patient treatment over the past decade. These specialized therapeutic interventions help patients navigate their own unique paths to healing.

The treatment plan for each patient is far from one-size-fits-all. “As therapists, we want to optimize treatment time with our patients. Therapeutic technologies that assist with mobility and gait training help us more efficiently and effectively progress patients toward their functional goals,” said Caroline King, PT, DPT, physical therapist at WakeMed.

King says gait training, the therapeutic practice of walking, has always been one of the trademark specialties of physical therapists.

Advances in rehabilitation technology are embraced by the team at WakeMed Rehab to help retrain muscles that patients are unable to recruit on their own due to weakness, injury or neurological deficit. Core therapeutic technologies that are regularly integrated into patient recovery plans at WakeMed Rehab include a wearable robotic exoskeleton (EksoNR™) and functional electrical stimulation.

## Reaching New Goals with Robotics

WakeMed Rehab uses the most current exoskeleton created by Ekso Bionics, the EksoNR. It is the first robotic exoskeleton to be FDA cleared for use with patients following a stroke, spinal cord injury, acquired brain injury and multiple sclerosis.

The wearable robotic device supports a patient’s trunk and legs and is used by specially trained physical therapists to promote correct movement patterns during standing and walking, while monitoring safety and avoiding fall risk.

“We were fortunate to be one of the first facilities in the nation to acquire and implement the use of the initial model of Ekso in 2012,” said King. “The EksoNR’s impressive and intuitive technology provides numerous rehabilitative benefits to progress a patient’s balance, coordination and strength.”





## Retraining the Body and Brain

EksoNR is used as a tool to progress patients with standing and walking as they recover from a neurological injury or condition. Ekso certified physical therapists have the ability to tailor the exoskeleton's settings to each patient's therapeutic needs and goals.

The EksoNR not only supports forward walking but also challenges backward walking, sidestepping and resisted walking.

This latest model is equipped with sophisticated sensors and software that help patients achieve high quality and high intensity repetitions of movement, which are crucial to neuroplasticity and improved function.

## Gaining Confidence and Freedom

EksoNR helps the WakeMed Rehab team get many patients on their feet sooner, allowing them to re-learn correct movement patterns. The goal is to help patients steadily regain more independence by recovering as much strength and coordination as possible to improve mobility and ultimately walk again without the assistance of this technology.

“Our therapy team has seen hundreds of patients make excellent progress with the use of Ekso over the last decade,” said King. Evidence shows that EksoNR not only helps patients achieve improved quality of movement while in the device, but excellent carry over outside of the device. Access to EksoNR at WakeMed Rehab gives physical therapists the opportunity to mobilize patients earlier in their rehabilitation for optimal outcomes.

Recently, WakeMed Rehabilitation Hospital was recognized as one of only seven 'Ekso Reference Centers' in the nation by Ekso Bionics. This achievement acknowledges WakeMed's investment, clinical development and creativity with Ekso over the past decade.

*“It really brings me joy to know that I can be part of the process to help people get back on their path to meaningful life activities.”*

— James Flanagan,  
MS, OTR/L, ATP

## Restoring Mobility with Electrical Stimulation

Functional electrical stimulation (FES) involves the use of low-level electrical current to achieve improved muscle contractions – helping move a patient's muscle if they are unable to flex it on their own or if the muscle is working at less than a normal level. In 2020, WakeMed Rehab opened a formal FES program facilitated by therapists who are specially trained to use FES to address patient goals for improved strength and function.

FES is mainly used for people who have neurological deficits from a stroke, traumatic brain injury or spinal cord injury; however, benefits have been seen for people navigating mobility challenges with other diagnoses as well.

The biggest advantage of the program at WakeMed Rehabilitation Hospital is that it gives patients better access to a very beneficial treatment modality. In addition to improving strength when patients may not have the ability to move on their own, FES can strengthen muscles in a consistent and functional way that encourages muscle growth and nerve regeneration. This treatment can also help slow the muscle atrophy process for patients with persistent neurological deficits.

## Experienced & Equipped

The highly trained team at the WakeMed FES program focuses on providing patients additional therapy with access to the use of FES cycles and a standalone Xcite. The use of the FES cycles and Xcite enable the WakeMed Rehab team to help people improve their mobility and gait sooner than with traditional therapy alone.

“Over my 15 years at WakeMed, it has always been a priority to provide our patients with the best possible, advanced and evidence-based therapies,” said James Flanagan, MS, OTR/L, ATP, occupational therapist and clinical specialist at WakeMed. “The devices that we use are sophisticated and can be complex to set up, so we've established an experienced team who can efficiently use this available technology.”

FES cycles use multiple channels of electrical stimulation to help patients cycle on a stationary bike using either their lower extremities or upper extremities. The cycle is programmed to stimulate muscles in a specific succession in order to elicit the proper movements through a cycling pattern. WakeMed's Rehabilitation Hospital's FES program has a 12-channel cycle with the ability to stimulate 12 muscle groups simultaneously and two other cycles that can each stimulate six muscles groups at once.

Additionally, the FES includes another 12-channel device called Xcite, which is a standalone device that allows patients to work on functional tasks such as sit-to-stand, reaching, transfers, and even activities of daily living tasks like brushing teeth and self-feeding. Xcite is a good option for patients who have more stability but need to improve finer control of muscles.

“If a patient has a specific functional deficit, there is likely a program that will address it on the Xcite,” said Flanagan. “And if the program does not exist for what we need, there is the capability to create new programs to fit an individual’s needs as we seek to reconnect them to meaningful activities.”

### Investing in the Transformation of Lives

The physical, social and emotional benefits of a patient’s functional mobility progress are priceless. With a focus on improved quality of life, the team at WakeMed Rehab consistently seeks to acquire the latest equipment

and training to enhance patient care and treatment. This commitment has set WakeMed Rehab apart from other facilities. “Thanks to the ongoing investments of the WakeMed Foundation and the commitment of the Rehab management team, we have been able to acquire up-to-date models, train various clinicians and gradually increase the number of patients who can benefit from the amazing technologies that are available,” said King.

Taking the necessary steps forward in therapeutic technologies is invaluable to WakeMed patients as they strive to take their next step in healing.

“As we continue to push the boundaries and combine conventional therapy with today’s technology, it’s a game changer to have the ability to pursue new things on the horizon that we believe will be beneficial for our patients,” said Flanagan. “It’s what enables therapists like me to continue to evolve professionally and practice with the passion that we do.”



FES cycle at WakeMed Rehab.



# MEET MARTHA MIDGETTE

*WakeMed Foundation Fundraising Program Specialist*

**M**artha Midgette is a fundraising program specialist with the WakeMed Foundation who is passionate about her community and helping others. Let's get to know Martha, how she found herself working in philanthropy and how the Foundation has supported WakeMed Rehab over the years.

**Q: Tell us about yourself.**

I'm a Raleigh, NC native with a deep love for my community. I have worked in philanthropy my entire career and have more than a decade of experience with local nonprofit and fundraising management. In 2015, I joined the WakeMed Foundation and have found every day to be a rewarding opportunity to see the work and impact that WakeMed has on its patients and their families. My role allows me to see how a community, our community, unite to make an impact.

**Q: What do you love most about working for the WakeMed Foundation?**

I resonate with the definition of philanthropy as "love of mankind." Like everyone in health care, you must have a passion for others – a "love of mankind" – to do the work. My job isn't on the frontlines, day-to-day interacting with patients, but donor dollars are. These dollars, like staff, are working together to make a difference and change lives for those patients in need. It can be as simple as the bus voucher that ensured a patient made it to an appointment, potentially preventing an infection; the education a physician received to perform with confidence a new technique on a patient; or a piece of equipment like the Ekso robotic exoskeleton that gives a patient a glimpse of hope. The story of the patient walking down the aisle still gives me goosebumps (see page 13 to read 'A Walk to Remember: Steven & Lauren's Story').



**Q: How has the WakeMed Foundation supported WakeMed Rehabilitation over the years?**

As WakeMed's philanthropic partner, the mission of the WakeMed Foundation is to raise and distribute funds that advance health care and improve the lives of the thousands of patients served by WakeMed each year right here in Wake County. Simply put, we help provide the resources needed to go "above and beyond" in providing the safest, highest quality care for our patients and community.

Rehab is such a critical part of the care and services we provide at

WakeMed. They are the last stop in the patient health care journey before re-entering the community. Thanks to the generosity of our donors, the WakeMed Foundation has been able to respond to the growing needs of WakeMed's Rehabilitation Hospital and Outpatient Rehab programs. Over the last decade, the Foundation has invested in advanced rehab technologies and therapy systems to support patient goals and established innovative programs and services backed by specialty training for staff.

**Q: With everything you do at the WakeMed Foundation, what's most important to you?**

Most important to me is integrity – the impact we share with our donors and the stories we hear truly move me, oftentimes to tears. Since I've been with the Foundation for almost nine years, I've been a part of the journey up to this point. I enjoy reflecting on where we have come from, but also appreciate all the work that has led us to where we are headed. WakeMed is and will be there now and in the future. And is oftentimes the big hug you didn't know you needed in the moments of joy and sadness, and everything in between.

To learn more about the WakeMed Foundation or to make a donation, scan the QR code.











# A Walk to Remember

## Steven and Lauren's Story

**S**teven and Lauren met as kids in elementary school. Steven was a year younger, so they knew each other by passing in the school hallways. Years later, as adults, they crossed paths again, and this time, they were inseparable.

A prior active-duty Marine, Steven was also committed to physical and nutritional health, and he worked out at the gym five days per week.

The two also enjoyed traveling and spent a great deal of time exploring the world around them. They loved visiting the beaches and mountains.

Since Lauren had little ones from a prior marriage, she also found in Steven a wonderful family man. They spent a lot of time with her two boys, enjoying Panthers games, and most recently, a trip to Disney World.

### A Proposal

With so much in common, the couple knew they were right for each other. In June 2019, Steven proposed, and they settled into life as a family of four with no idea of the challenges that loomed ahead.

Six months later – everything changed.

### A Traumatic Collision

On Saturday, January 25, 2020, a crisp and clear winter day, Steven and Lauren were joyriding their motorcycle down Highway 70 heading out to enjoy an afternoon lunch. Suddenly, a truck — that had failed to yield — merged onto the highway. The vehicles collided at full

speed, sending the couple flying from the motorcycle.

A flurry of people saw the accident and called 911. Almost immediately an ambulance arrived on scene and took the couple to a nearby hospital. The care team kept Lauren there and treated her injuries, but they airlifted Steven to ECU Health's Trauma unit in Greenville, NC.

Lauren was discharged that Monday. Four days after discharge, she went to Greenville to see Steven in the hospital.

Lauren says, "He was in a medically induced coma due to a traumatic brain injury (TBI) categorized as a diffuse axonal injury (DAI) as a result of a basilar skull fracture behind his left ear. For this reason, Steven ended up with right-side weakness."

About six days into the coma, the care team began to see increased brain activity, so they administered medication to slowly bring Steven out of his coma.

Lauren says, "The medical team believes his muscle mass helped with his recovery."

Not only did Steven suffer a TBI, but he also suffered several serious fractures. As a result, he spent five and half months in various medical facilities.

The first two months were at ECU Health. There, he was diagnosed as an "open book" broken pelvis. He also had severe fractures to both of his wrists. Since the most severe injury was to his pelvis, his medical team performed a bridging device treatment using occipital cervical rods under the skin. This injury took eight weeks to heal.



Once released from the hospital, Steven was a patient for two months in a long-term care facility while his fractured bones continued to heal. This was so that once he went to rehab, he'd be able to participate fully in therapy. Lauren says, "From that point forward, Steven has made significant progress in his journey back to health."

### **The Most Advanced Care from WakeMed Rehabilitation**

Upon discharge from long-term care in June 2020, Steven spent 30 days at WakeMed's Rehabilitation Hospital. While he needed more rehab, his insurance only authorized 30 days of inpatient care per year.

After 30 days, Steven transitioned to WakeMed's Outpatient Rehabilitation in Clayton moving back into inpatient rehab once per year in 30-day intervals.

Lauren says, "WakeMed Rehabilitation has been a godsend for our family. During that initial stay, I was able to remain informed of his progress while returning to some sense of normalcy. Also, since the hospital was local, it was easy to commute to visit with Steven."

"Our rehab team was amazing, and Joe - Steven's rehab clinical aide - was such a source of encouragement for

him. They have a strong, positive rapport. It's hilarious, honestly. They yell hello to each other down the hall when Steven is there to see Dr. O'Brien," continues Lauren.

Steven goes regularly to see Patrick O'Brien, MD, a community physiatrist and WakeMed Rehab's medical director who is a nerve, muscle and bone expert that treats injuries and illnesses which affect movement.

Lauren says, "This doctor is so personable and knows Steven as a patient, not a medical record number. He also knows my name and asks how I am doing, which is amazing since I'm not even the patient. And, honestly, this is why we keep coming back to WakeMed — it's the continuity of care and the positive rapport that we've built with the health care team. Everyone is so kind and friendly."

### **Plans for a Wedding**

In April 2022, Steven's cognition and mobility were better, so the couple decided to set a date and plan a wedding. It just all made sense.

Lauren says, "Before and during our relationship, I was a recreational therapist for 10 years, so I understood Steven's medical conditions and treatments. I was able to capitalize on my understanding of recovery after severe injury to support Steven's progress and his continued hard work toward recovery."



“When Steven first came home from the hospital with the boys and I, my years of training kicked in. I explained to the boys that Steven would look different and sound different, so we would be doing things differently. Since Steven has come home, we’ve gotten right back into it — going to the beach, mountains, Disney and on airplane rides. As a couple, we are committed to showing others that it is possible to live a full and happy life after injury.”

### Wedding Preparations

Couples are concerned about many things when preparing for a wedding: the gown, the guests, the food, the venue. Yet, for Lauren and Steven, there was just one major wish for the wedding — that Steven could stand at the altar and walk out with his bride at the end of the ceremony.

The couple shared their desire with Dr. O’Brien and physical therapists Caroline King and Blair Hobble got to work. Dr. O’Brien advocated for Steven’s authorization to use the exoskeleton. And Caroline and Blair volunteered their free time for five solid weeks prior to the wedding — helping Steven get in and out of the exoskeleton and practice the routine for their big day.

Lauren says, “It was Steven’s only wish for the wedding. I’m grateful for WakeMed making this wish come true, so we could surprise our guests with this special moment.”

*“Since Steven has come home, we’ve gotten right back into it — going to the beach, mountains, Disney and on airplane rides. As a couple, we are committed to showing others that it is possible to live a full and happy life after injury.”*

— Lauren Narron

### The Most Beautiful Day

On September 30, 2022, Steven and Lauren were married at The Farm at 42 in Selma, North Carolina, surrounded by 100 family, friends and therapists — who had become family and friends.

Lauren says, “We got to be the bridge to introduce the WakeMed inpatient team and the WakeMed outpatient team. I was like, “Thank you for your inpatient therapy and thank you for your outpatient therapy, and thank you all for helping to make this day happen.”

During the ceremony, Steven went down the aisle to the altar in his wheelchair. While the bridal party came in, Blair and Caroline transitioned Steven into the exoskeleton right at the altar.

“Blair made it completely comfortable for me,” says Steven.



## SUPPORT GROUPS

### WakeMed Amputee Support Group

Third Wednesday of each month

4 to 5:30 pm

WakeMed Conference Dining – Raleigh Campus  
For information or to join the meeting virtually, call **919-350-8903** or email Beth Soto at [bsoto@wakemed.org](mailto:bsoto@wakemed.org).

### WakeMed Spinal Cord Injury Support Group

First Wednesday of each month

Noon to 1 pm

WakeMed Conference Dining – Raleigh Campus  
For information or to join the meeting virtually, call **919-350-8789** or email Maria Rivera at [marivera@wakemed.org](mailto:marivera@wakemed.org).

### WakeMed Stroke Support Group

Second Tuesday of each month

Noon to 1 pm

WakeMed Health Park Classroom – Raleigh Campus  
For information or to join the meeting virtually, call **919-350-8113** or email Jaycie Frye at [jayfrye@wakemed.org](mailto:jayfrye@wakemed.org).

### Cary, NC Brain Injury and Stroke Support Group

Second Thursday of each month

6 pm

Conference Center - WakeMed Cary Hospital  
For more information on this in-person event, email Joe DeHart at [joedehart2000@yahoo.com](mailto:joedehart2000@yahoo.com).

### Brain Injury Association of North Carolina (BIANC) Support Groups

The BIANC hosts multiple support groups across the state. For more information, call **919-833-9634** or visit [www.bianc.net](http://www.bianc.net).

### Cary Stroke Support Group

Meets virtually. For more information, call **919-244-6221**.



WakeMed Rehab's therapists celebrate alongside Steven and Lauren on their wedding day.

Then when “Can You Feel the Love Tonight” began to play, Lauren walked down the aisle with her dad, and Steven stood up to receive her. Steven and Lauren then sat in special chairs for the vows and stood together for the kiss.

Once it was time for the couple to walk back up the aisle, Blair came over and hid behind Steven for support as the couple walked hand-in-hand.

“You couldn’t even tell there was anyone back there while he walked in the exoskeleton,” says Lauren.

Steven says, “Lauren was so pretty.”

By the end of the recessional, Steven was overcome with emotion.

Lauren says, “Steven was definitely feeling and enjoying

the moment. He was singing our recessional song by Savage Garden.”

### **A Promising Future**

Since the wedding, Steven and Lauren have been settling into life together as a newly married couple.

He says, “My next goal is to drive Lauren around in a car for 30 minutes.” It’s all about baby steps.

His ultimate plan for the future, however, is to walk again. In the meantime, the couple is planning their honeymoon, hopefully a romantic cruise.

Lauren says, “We haven’t slowed down since Steven was released from inpatient rehab. We continue to enjoy our lives together with each new adventure.”

*“It was Steven’s only wish for the wedding. I’m grateful for WakeMed making this wish come true, so we could surprise our guests with this special moment.”*

— Lauren Narron





## Have You Considered Participating in a Research Study or Clinical Trial?

By participating in clinical research, you can help scientists and medical experts test the safety and effectiveness of new medical treatments, devices or therapies. While the treatment that you receive may offer you the best outcome, it is important to evaluate all your options before you decide that a clinical trial is right for you.

### *Why should I participate in a clinical trial?*

- Access to new treatments that are not available to the public
- Expert medical care at a leading health care facility
- Playing an active role in your own health
- Helping others by contributing to medical research

### *What are the risks and drawbacks?*

- Unpleasant, serious or even life-threatening side effects
- Ineffective treatment
- Time commitment. You may need to travel a long way to the study site or stay in the hospital

### *How can I enroll in a clinical trial?*

The WakeMed Clinical Research Institute (CRI) conducts clinical trials of promising new treatments and advances in many medical conditions, including many rehab-related conditions.

For more information about clinical trials and to help you make an informed decision, scan the QR code.

Talk with your doctor if you are interested in participating in a research study or clinical trial.



# Hope *for the* Future

## INNOVATING WITH REHAB TECHNOLOGY

**T**echnology is moving faster than ever before. Virtual reality that speeds healing in rehab. Functional electrical stimulation and bio-feedback restoring muscle movement and performance. Wearable robotics and assistive technology helping people regain their full functional mobility. These are just some of the innovations transforming the level of care provided by the dedicated therapists at WakeMed Rehabilitation Hospital and Outpatient Rehab programs.

Thanks to the support of the WakeMed Foundation and WakeMed Administration, we have been able to build upon and grow our offering of innovative therapeutic technologies to our community.

We are excited about what the future holds for WakeMed Rehab and the technologies to come. *Let's dive in!*

### Virtual Reality in Rehab Therapy

Going through rehab can be tough, especially if your condition leaves you with pain, weakness, balance difficulties or limited mobility. Using virtual reality in rehab can be a novel and fun approach to care and effective in keeping patients engaged in their recovery.

By 2025, WakeMed Rehab hopes to integrate the C-Mill VR+ by Motek, an advanced training and evaluation treadmill for gait and balance rehabilitation that simulates everyday life challenges through augmented and virtual reality in a safe and comfortable environment.

Assisting patients through early to late rehabilitation stages, the C-Mill serves as a motivational therapy tool that combines a treadmill with force plate technology and video recording from front and side angles for optimal analysis of gait patterns. The C-Mill features an oversized walking surface and LCD screen that displays virtual reality applications focused on balance, walking and dual-tasking. Patients walk on the extended treadmill and interact with different augmented experiences in front of them.

Additionally, the C-Mill can project visual obstacles and targets on the floor that replicate scenarios such as walking in a crowd or avoiding obstacles. An overhead harness support system can bear a portion of a patient's body weight, helping individuals to start balance and pre-gait therapy earlier in rehab without increased fall risk.

Scan the QR code to see the C-Mill VR+ in action.



### Vision, Motor & Balance Training

Bioness Integrated Therapy System (BITS) is a software-based therapy platform designed to challenge, assess and track vision, cognitive, motor and balance deficiencies. BITS interactive touchscreen and diverse program options challenge patients to improve performance through the use of visual motor activities, auditory processing, cognitive skills, endurance and balance training. The system can be customized for patients of all functional and mobility levels across the continuum of care by disciplines including physical therapy, occupational therapy and speech-language pathology.

WakeMed Rehab currently uses BITS for its outpatients and is looking to add an additional system to its Rehab Hospital program in 2024.



BITS empowers patients and clinicians with the tools needed to improve performance.



## TECHNOLOGY TO IMPROVE PELVIC HEALTH

### Biofeedback to Retrain Pelvic Floor Muscles

Exercising muscles in the pelvic floor can be difficult since many people often don't know where those muscles are or how to contract them. Pelvic floor training improves the efficiency of muscle contractions. Biofeedback, the use of a sensor pressure probe that is inserted into the vagina or rectum, senses the strength of contractions of the pelvic floor muscles to help increase awareness of when muscles are contracting or relaxing through a visual representation.

The Pathway CTS Pelvic Muscle Rehabilitation System is an essential tool for WakeMed's pelvic health program. The system offers two channels of surface biofeedback and one channel of pelvic floor stimulation to allow the therapist to work with each patient to up-train weak muscles or down-train hypertonic muscles, while also providing visuals for the patient to remain engaged throughout the treatment session.

## TECHNOLOGY TO SUPPORT CANCER CARE

### Early Lymphedema Detection

The lymphatic system runs like a highway in your body. Certain cancer treatments including surgery, radiation and chemotherapy damage and block the lymphatic system, resulting in lymphedema – a condition that occurs when fluid builds up due to a block in the lymphatic system.

In most people, lymphedema starts small and gets worse over time. Early detection of lymphedema is key in taking control of your survivorship before it becomes chronic.

In less than a minute, SOZO® Bioimpedance Spectroscopy can rapidly detect certain changes in the body before any symptoms occur, which can reduce the incidence of clinical lymphedema by almost 90 percent. This technology makes lymphedema prevention possible for some patients, and it can monitor the efficacy of treatment in patients who have already been diagnosed with it.

WakeMed is the first health system in the state to include advanced SOZO technology as part of its lymphedema screening evaluation.

### Cold Laser Therapy for Pain Relief

Cold laser therapy, also known as low-level laser therapy, is a therapeutic modality that uses low-intensity light to improve blood flow and decrease pain and inflammation to injured tissues. It is a painless treatment and may be recommended alongside your comprehensive rehab program.

These three pieces of technology are currently a part of WakeMed's Outpatient Rehab program. By 2024, WakeMed Rehabilitation hopes to gain additional units to continue to improve our patients' health outcomes.



Patient undergoing lymphedema screening with SOZO.



# Strategic Direction for 2023

## PEER SUPPORT

The WakeMed Rehabilitation team is focused on creating programs and services that help patients realize the best possible functional outcomes. Research shows that patients who are actively engaged in their care achieve superior results. Depression is noted to be a risk factor associated with poor engagement and often goes hand-in-hand with functional disability. Peer support services can be an excellent complement to more formalized support and counseling services available to patients at WakeMed.

COVID brought visitation restrictions to WakeMed that made an impact on WakeMed Rehab's individual, face-to-face Peer Support program. During this time, support groups were transitioned to a virtual platform to ensure patients had access to a community of individuals with similar challenges. During 2022 and 2023, Rehab Hospital leadership resolved to rebuild the individual Peer Support program and a strategic goal was established to improve and standardize processes for peer support services in 2023.

There were a few key components associated with this. First, rehab leaders identified a volunteer who had expressed an interest in serving WakeMed Rehab in a more meaningful way. A volunteer job description

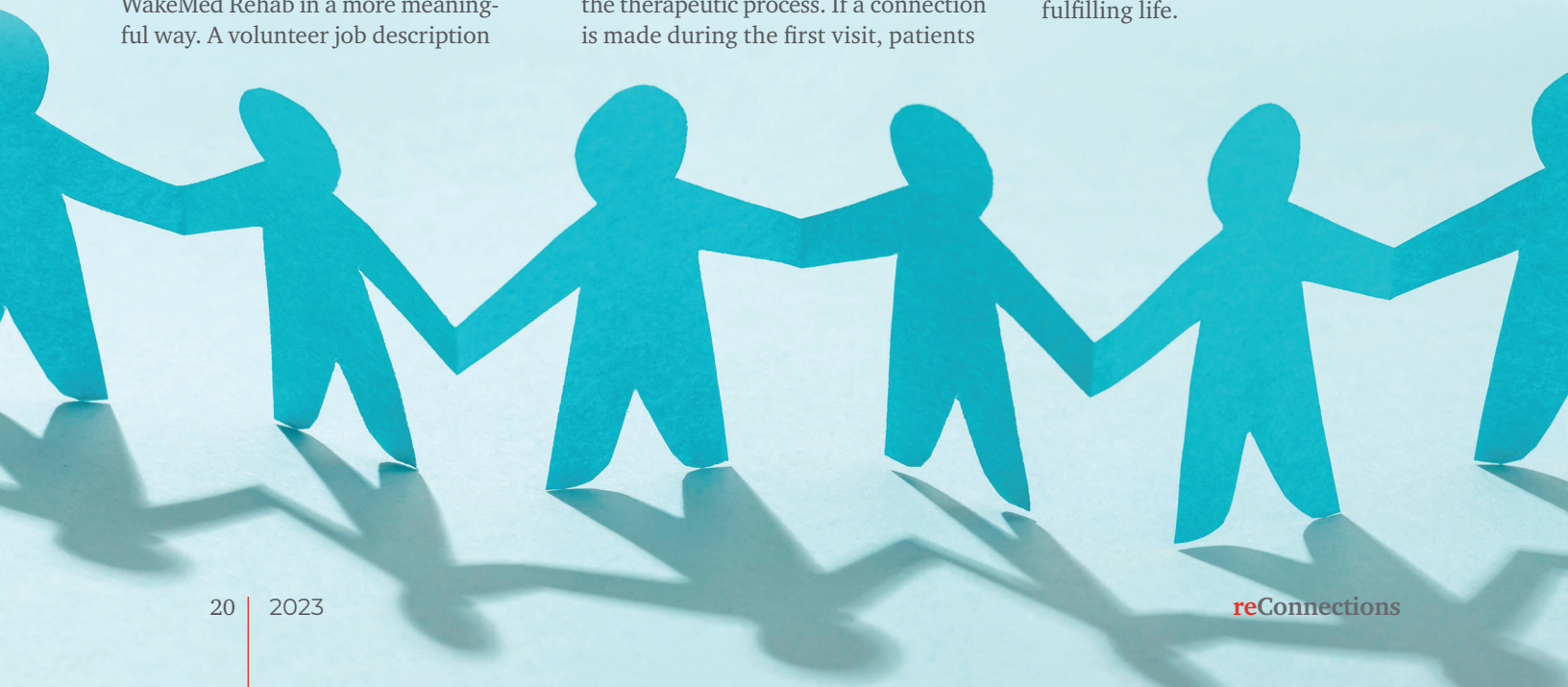
was written for him, and he became WakeMed Rehab's first peer support coordinator. The peer support coordinator serves as a liaison between WakeMed's Volunteer Services department, WakeMed Rehab leadership and the volunteer peer supporters. He personally walks newly identified peer supporters through the process of engaging with Volunteer Services and provides support if needed as they work to obtain all the screenings and education required to be a volunteer. Once completed, he initiates the peer supporter role-specific orientation. He also maintains periodic check points with each peer supporter to field any questions, assist in removing barriers and provide recognition and appreciation for services.

WakeMed leaders also met throughout the year to establish standard processes associated with identifying patients who would like a visit from a peer supporter and matching them with the most appropriate peer supporter for their initial visit. For most programs, peer supporters make themselves available weekly so that patients can easily request for a visit. The session is placed on the patient's schedule to ensure that no other activities interfere with this important part of the therapeutic process. If a connection is made during the first visit, patients

and peer supporters are empowered to exchange contact information or schedule additional visits.

Finally, to ensure the competency and ongoing engagement of the peer supporters, two additional initiatives are underway. WakeMed Rehab leadership established a mechanism for ongoing education on topics such as stages of grief, maintaining therapeutic boundaries and active listening. A kick-off appreciation event was held early in 2023 and annual events will be ongoing. Secondly, based on peer support input, semi-annual newsletters will be distributed to formalize the program, foster connection, provide additional education and facility news, and to introduce new peer supporters.

Recovery from a life-altering health condition or injury can be a long process. Being able to connect with someone who can relate can be a springboard to a more timely and healthy adjustment. Knowing that there is productive and satisfying life after illness/injury gives patients hope to push through the early days. The Peer Support program at WakeMed, with both group and individual support options, helps patients more actively engage in their rehab program and kick-starts their journey back to fulfilling life.







# WAKEMED REHABILITATION HOSPITAL DATA

The entire WakeMed Rehab team thanks the providers, patients and families who support our efforts to provide high-quality care and service across our care continuum. The following data is derived from admission and discharge information from October 1, 2021 through September 30, 2022.

## REHABILITATION HOSPITAL

### Admission Diagnosis

Cerebrovascular Accident (Stroke)	27%
Orthopaedic	16%
Spinal Cord Injury	9%
Brain Injury	11%
Debility	11%
Multiple Trauma	11%
Amputee	5%

### Our Patients with Stroke

Total Number	421
Average Age	69
Average Length of Stay	20 days

### Our Patients with Orthopaedic Conditions

Total Number	244
Average Age	71
Average Length of Stay	15 days

### Our Patients with Spinal Cord Injury

Total Number	143
Average Age	60
Average Length of Stay	21 days

### Our Patients with Brain Injury

Total Number	175
Average Age	63
Average Length of Stay	18 days

### Our Patients with Multiple Trauma

Total Number	165
Average Age	50
Average Length of Stay	17 days

### Our Patients with Amputations

Total Number	72
Average Age	62
Average Length of Stay	17 days

### Pediatric Patients (ages 4-17)

Total Number	27
Average Age	12
Average Length of Stay	14 days

To Make a Referral  
to WakeMed Rehab

Inpatient: 919-350-7876

Outpatient: 919-350-7000

# CONGRATULATIONS

## Excellence in Healthcare Award Recipients



Each year, Professional Research Consultants (PRC) recognizes those health care organizations that have gone above and beyond to achieve excellence in the patient and family experience with the Excellence in Healthcare Awards program. These nationally recognized awards are presented to departments, practices and individual providers that have earned high patient satisfaction survey scores. Specifically, they are based on the percentage of patients who rate the Overall Quality of Care as “excellent.” This year, WakeMed received numerous Top Performer Awards, which recognize service lines and providers scoring at the 100<sup>th</sup> percentile within the PRC national client database, and 5-Star Awards, which recognize those at or above the 90<sup>th</sup> percentile.

### WakeMed Rehab Units/Practices

#### Top Performers (100<sup>th</sup> Percentile)

- Physical Therapy - Brier Creek
- Pulmonary Rehab - Cary
- Pulmonary Rehab - Raleigh

#### 5-Star Awards (90<sup>th</sup> Percentile)

- 3C Inpatient Rehab
- Outpatient Rehab - Cary
- Outpatient Rehab - Durant Road
- Outpatient Specialty Rehab - Cary Hospital
- Outpatient Wound Care - Raleigh Campus
- Physical Therapy - Kildaire Farm
- Physical Therapy - Oberlin