



**D**ESPITE THE DETRIMENTAL effects of back pain, many patients are still hesitant about undergoing surgery because the traditional approach can be invasive and result in a long, painful recovery process. The Sonntag Spine Center at Barrow Neurological Institute, led by Juan Uribe, MD, is revolutionizing the treatment of spine injuries and disorders through minimally invasive surgical procedures that drastically reduce patients' recovery time and improve their quality of life. The spine team works tirelessly to continue improving minimally invasive surgical techniques for better patient outcomes by conducting innovative, collaborative research and training future generations of leading spine specialists.



**3,000+**

spine surgeries  
annually



**450+**

Sonntag Spine  
Symposium attendees



**20+**

peer-reviewed articles  
published in past year

# BARROW NEUROLOGICAL INSTITUTE BY THE NUMBERS



## CLINICAL IMPACT

**117,700+**

total number of  
patient visits

**5,800+**

brain and spine surgeries

**14**

Centers of Excellence



## GLOBAL IMPACT

**59**

research fellows and visiting  
scholars: Argentina, Austria,  
Brazil, Chile, China, Colombia,  
Czech Republic, Denmark,  
Finland, Germany, India, Italy,  
Jordan, Mexico, Pakistan,  
Peru, Portugal, South Korea,  
Spain, Taiwan, Turkey,  
United Kingdom

## LIFE-CHANGING SPINE TREATMENT

While responding to a routine call one day, police officer Kathy Donaldson was thrown down a flight of stairs, fracturing several vertebrae in her spine. Although she immediately had surgery to repair the damage, Kathy found herself living with excruciating back pain. She could no longer go out with friends, spend time with her children, or play with her grandchildren without being in agony. The pain eventually became so severe that she thought several times about ending her life.

Then, Kathy found Barrow Neurological Institute, where she received a series of complex operations on her spine. The surgeries were all successful, and Kathy is now living pain free. She says, "My children have their mother back and my grandchildren have their grandmother back. I can't describe how much that means to me." With support from Barrow Neurological Foundation donors, the spine team is able to advance research, innovation, and training so more patients like Kathy can go back to living a full and healthy life.

## RESEARCH ADVANCEMENTS

With every move you make, different amounts of force and pressure are applied to your spine. This constant wear and tear can make it difficult for patients to achieve long-term results after spine surgery without needing a revision operation. That is exactly what Kathy experienced: She had surgery to repair her fractured vertebrae, but over time, her back continued to degenerate until she was in excruciating pain and needed more extensive treatment.

The Spinal Biomechanics Laboratory, led by Brian Kelly, PhD, works closely with neurosurgeons to develop new techniques and devices to improve patient outcomes after surgery. Neurosurgery resident Harrison Farber, MD, collaborated with the laboratory on two studies that addressed complications in spinal interbody fusion surgery, one of the most common back surgeries. The first study evaluated several different factors that could be changed to prevent grafts from breaking through the disc space after surgery, while the second study evaluated a new technique for spinal interbody fusion to see if it can decrease complications such as instrument failure and hardware breakage. Both of these studies were made possible through philanthropic funding raised by Barrow Neurological Foundation.

Also supported by philanthropy, neurosurgery resident James Zhou, MD, is conducting a follow-up study testing a novel immobilization device to keep the spine in alignment. This device, which can be placed using a minimally invasive procedure, could potentially replace current gold-standard

approaches to spine immobilization, which include a hard cervical collar and backboard, a scoop stretcher, and a vacuum splint.

## EDUCATION AND TRAINING

Barrow Neurological Foundation donors helped push the Sonntag Spine Center to the forefront of neurosurgical training with the Virtual Reality (VR) Spine Lab. This revolutionary educational platform creates an immersive 3D environment in spinal anatomy that provides advanced training across a wide breadth of spinal procedures. The VR Spine Lab has grown rapidly over the past year and is now working with Barrow Global and the Franke Global Neuroscience Education Center to bring VR technology for surgical training to developing countries.

International research fellow Juan Pedro Giraldo, MD, and international undergraduate intern Gerardo Gomez Castro, both of whom were supported by the Franke Global Neuroscience Education Center, collaborated with Barrow neurosurgeons on an innovative project that aims to measure the effects of muscle size and fatty tissue on surgical outcomes. Dr. Giraldo received the prestigious 2023 Research Fellow Award from the North American Spine Society for his work on this project.

In addition, the spine team held its second annual Sonntag Spine Center Symposium at Barrow in February 2023, with more than 450 of the country's top spine surgeons and researchers in attendance. The symposium included lectures, panels, and case presentations covering a variety of topics in spine surgery techniques and technologies.

## ON THE HORIZON

The Spinal Biomechanics Laboratory is working to acquire critical equipment, including robotic devices and software, needed to create and test the latest surgical devices. The team also plans to increase its number of research projects by recruiting another research fellow and a part-time research intern. In addition to its continued efforts bringing VR technology for neurosurgical training to developing countries, the VR Spine Lab team also plans to expand its suite of surgical procedure applications by acquiring new software and equipment.

The spine team also will be focusing on acquiring additional equipment for the newly built Sonntag Spine Center Golf Research Laboratory to help scientists analyze patients' spinal biomechanics both before and after surgery. The Foundation will be hosting a golf tournament fundraiser in 2024 to support these efforts.

## BARROW NEUROLOGICAL INSTITUTE BY THE NUMBERS



### RESEARCH

**327**

active research studies

**200+**

peer-reviewed  
journal publications

**\$12 MILLION**

in new federal research  
grant support



### DONOR IMPACT

**3,898**

total donors

**\$44 MILLION**

distributed to Barrow Neurological  
Institute, including:

**\$25.4 MILLION**

designated to the  
Ivy Brain Tumor Center

**\$5.3 MILLION**

designated to specific  
centers/programs

**11.9 MILLION**

for basic, clinical, and  
translational research

**\$1 MILLION**

in endowments



Juan Uribe, MD, is chief of the division of spinal disorders, Volker Sonntag chair of spine research, and vice chairman of neurosurgery at Barrow.

## THANK YOU FOR YOUR SUPPORT

Our goal in the Sonntag Spine Center is to improve patients' quality of life through innovative and individualized spine surgery. With the support of generous donors like you, we are able to continue working toward this goal by advancing neurosurgical education, research, and innovation. An example of this is the strong progress we have made with resident-led research projects in the Spinal Biomechanics Laboratory, including the two spinal interbody fusion surgery studies led by Dr. Farber and the novel spine immobilization device study led by Dr. Zhou.

Our residents also have critical roles in helping to expand the Virtual Reality Spine Laboratory, so more trainees around the world have access to this indispensable neurosurgical education platform. This intersection of education, research, and innovation is what it takes to continue improving patient outcomes, and it would not be possible without your support.

With gratitude,

Juan Uribe, MD  
Chief, Spinal Disorders  
Sonntag Chair of Spine Research  
Vice Chair, Neurosurgery  
Barrow Neurological Institute

The mission of Barrow Neurological Foundation is simple: to be the catalyst of our donors' passion for transformation by providing the resources for Barrow Neurological Institute to achieve its mission of saving human lives through innovative treatment, groundbreaking research, and by educating the next generation of the world's leading neuroclinicians.

**Barrow**  
Neurological Foundation

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