

International Center for Spinal Cord Injury



We are all born with great potential.
Shouldn't we all have the chance to achieve it?



International Center for Spinal Cord Injury
at Kennedy Krieger Institute
Research. Restoration. Recovery.



For many years, conventional wisdom held that most improvement from spinal cord injuries occurred in the first six months of recovery, and that improvement was virtually impossible after two years. “Rehabilitation” focused mostly on teaching patients how to compensate for injuries thought to be irreversible. **Conventional wisdom was wrong.**

One of the first facilities of its kind, the International Center for Spinal Cord Injury at Kennedy Krieger Institute was founded on the philosophy that individuals with paralysis can always hope for recovery of sensation, function, mobility, and independence—months or even years after their injuries. To maximize this potential, the center offers an intense, medically supervised therapy program that uniquely emphasizes activity-based restorative therapies focused on recovery from spinal cord injuries for both children and adults—even those with chronic paralysis.



“I’ve just learned how strong a person I am. People have been telling me that I could do anything if I put my mind to it. Every little step that I make is a big step for me; I just look at it as one more thing that’s going to help me get out of the chair. Now I can move my left leg a little. That’s going to make me strive even harder to get out of the chair.”

-Van Brooks Jr.

Our Treatment Approach

The center emphasizes an innovative therapy technique known as activity-based restorative therapies (ABRT). As the nervous system develops, it requires patterned neural activity to promote cell regeneration and differentiation. When a person experiences a spinal cord injury, the connection between the brain and limbs is lost—the body cannot receive the signals from the brain necessary to prompt activity. During ABRT, therapists and physicians use specially designed exercise equipment to simulate normal movements, a practice that some believe can help restore connections and help patients' bodies remember how to move. Treatment plans are developed with the patient and family, and are tailored to meet the unique needs of each patient.

One of the primary methods the center uses to prompt movement is functional electrical stimulation (FES). With FES, a computer sends electrical messages to a patient's arms or legs, signaling the muscles to contract and perform a motion that would otherwise be impossible, such as pedaling a bike.



Aquatic therapy, during which patients engage in exercises in the near-weightless environment of a pool, is another innovative approach. The buoyant force of water supports up to 90 percent of a person's weight and provides a unique therapeutic environment. People with paralysis can perform activities in water that would be impossible for them on land. This therapy, like cycling an FES bike, can provide the patterned stimulation needed to promote the growth of neural cells.



Locomotor training, using a partial body weight-supported environment over a treadmill, involves retraining the nervous system by practicing normal gait kinematics at normal walking speeds. For individuals unable to initiate stepping, two therapists will help advance the lower extremities and ensure an efficient and technically correct gait pattern. Gait training allows a person to relearn natural walking while recovering mobility. As gait pattern is established, the individual is allowed to bear progressively more weight through the lower extremities. In an incomplete spinal cord injury, partial body weight-supported walking therapy is followed and complemented by walking on a traditional surface.

Our patients also spend therapy time strengthening the core muscles of the trunk and abdomen, which are needed to sit and stand, and conducting standing activities to prepare for more patterned activity that simulates walking.



Who Can Benefit

Although most people link spinal cord injury with sudden traumatic injury, such as a motor vehicle accident or a fall, paralysis can also be caused by conditions such as transverse myelitis, multiple sclerosis, spinal tumors, or AV malformations, as well as spina bifida or cerebral palsy. The programs offered at the International Center for Spinal Cord Injury can benefit individuals with paralysis caused by any of these conditions.



In addition, people with other rare neurologic conditions—such as neurofibromatosis, adrenoleukodystrophy, vascular malformations of the central nervous system, ALS (amyotrophic lateral sclerosis, or Lou Gehrig’s disease), and Friedrich’s ataxia—are also well-suited to this program.

The center welcomes children, adolescents, and adult patients to our medical and therapy programs. While most traditional therapy programs are designed for adults and must be modified for children, here, we have programs and equipment that have been developed specifically for children and adolescents. Additionally, the members of our interdisciplinary team have years of experience developing and tailoring treatment plans with the unique physical, developmental, educational, and social needs of children in mind. These treatment plans include recreational and functional activities geared

toward motivating children, while improving their skills. Because our center treats both children and adults, we provide a seamless transition of care from pediatric to adult spinal cord injury specialists, ensuring our patients continue to receive needed care into adulthood.



Chronic Spinal Cord Injury

Although the International Center for Spinal Cord Injury welcomes patients in the acute phases of rehabilitation, the center focuses on long-term therapy programs designed to be followed at home. Caregivers are trained to deliver these therapies to their child or family member. Over time, these techniques are significantly less costly and easier to adapt to individual family lifestyles than inpatient rehabilitation.

The center's ultimate goal is to help patients recover mobility and independence, but the therapies pursued here can also benefit those who do not recover function. People with paralysis often face skin breakdowns, infections, osteoporosis, and other symptoms of premature aging resulting from immobility. Our approach promotes movement to help patients avoid complications caused by immobility that can threaten quality of life and are costly to treat.

“It was the fastest and farthest I’ve gone without wheels in as long as I can remember. The freedom was just incredible... I was just so overwhelmed with how awesome it was.”

—Marshall Garber on an Institute-sponsored adaptive ski trip





Our Programs

Treatment plans are developed with the patient and family, and are tailored to meet the unique needs of each patient. A physiatrist and therapy team evaluate each patient's medical history and conduct a thorough physical examination prior to the first therapeutic session. The results are used to adapt therapy to an individual's capabilities, and regular reevaluations occur throughout the process to ensure continued safety and effectiveness.

Inpatient Program:

The inpatient program, directed by a physician, is a comprehensive evaluation and treatment program for children and young adults, ranging in age from birth to 21 years, with acute or chronic spinal cord dysfunction. Based on these initial evaluations, an intensive rehabilitation plan is tailored to the unique needs of each patient and family. Inpatients receive at least four hours of therapy each day, and most receive more.

Outpatient Programs:

There are a variety of outpatient programs available to meet the unique needs of each patient. In our outpatient medical clinic, physiatrists provide evaluations, periodic follow-ups, and medical management of chronic spinal cord injuries and paralysis for patients of all ages. The focus is to minimize and prevent medical complications and promote lifelong health.

Our medically supervised outpatient therapy program also welcomes patients of all ages. Therapy sessions are conducted on an individual basis and focus on the achievement of goals established between the patient, physician, and therapist. Upon discharge, all patients receive an individualized, detailed home rehabilitation program to improve and maintain gains between bouts of therapy. There are two options for outpatient therapy:

Short-term intensive therapy: In this five-day-a-week program, patients attend therapy for two to three weeks and receive a minimum of three hours of therapy each day. This program is convenient for out-of-state patients.

Extended intensive therapy: In this program, patients attend therapy one to three times per week for eight to 12 weeks and receive a minimum of three hours of therapy per session. This program is convenient for local patients and families.

Aquatic Therapy Program:

Designed to augment land therapy, aquatic therapy is used as a treatment modality throughout the rehabilitation process and offers many benefits to patients with varying



levels of function. The center has two state-of-the-art pools with a range of warm water temperatures and therapeutic treatment options, built-in treadmills for retraining and observing gait patterns, video systems for monitoring therapy activities, multiple jets used for resistance, and floors that operate on lifts to allow barrier-free entry and exit for easy access by patients in wheelchairs.



Other Services

Seating Clinic: The center's Seating and Mobility Clinic provides comprehensive evaluations, recommendations, and fittings of wheelchairs and specialized seating systems, including pressure mapping to determine the best equipment to meet your mobility and positioning needs. Selection of the appropriate wheelchair and seating system is an important process, especially when an individual depends on a wheelchair for mobility.



Orthotics Clinic: The Orthotics Clinic within the center provides an interdisciplinary approach to bracing through comprehensive examinations, assessments, and analysis to make recommendations that will best meet each patient's needs. In collaboration with patients and their families, therapists, orthotists, and the medical team work to optimize each patient's function through appropriate bracing.

Life Through Motion Wellness Program: Furthering our continuum of care, the center offers a wellness program with personal training options. Designed to augment therapy, the wellness program provides opportunities for consistent physical activity outside of therapy to help build and improve strength, flexibility, balance, endurance, and cardiovascular health.

Adaptive Sports Program: Our commitment to lifelong health extends beyond the hospital walls. The benefits of sport and recreational activities for individuals with disabilities are well recognized from both a health and quality of life perspective. These benefits include rebuilding strength, increasing independence, building self-confidence, and increasing socialization. We offer a range of programs that are both competitive and recreational, including adaptive hand cycling, virtual and adaptive sailing, wheelchair rugby, and wheelchair lacrosse. Through these activities, we hope to help patients achieve goals many thought were impossible. To learn more about the activities and sports offered through the Kennedy Krieger Adaptive Sports Program, visit [kennedykrieger.org/adaptive-sports](https://www.kennedykrieger.org/adaptive-sports).



Additional Services:

- Bone density measurements by dual-energy X-ray absorptiometry (DXA) scans to prevent, detect, and treat osteoporosis
- Urodynamic studies to assess and address bladder performance (available only to adult patients)
- Nurse consultation regarding skin issues and bowel and bladder management
- Ongoing monitoring by our nursing staff
- Nurse case management for information and general assistance

Our Team

Because patients recovering from a spinal cord injury or paralysis may have complex needs, an experienced, interdisciplinary treatment team works with each patient.

The team includes:

- Adaptive aquatic specialists
- Aquatic therapists
- Assistive technology professionals
- Nurse case managers
- Nurse practitioners
- Nurses
- Occupational therapists
- Orthotists
- Physiatrists
- Physical therapists
- Psychologists
- Seating and mobility specialists
- Social workers





Pfeiffer's Story

At 4 years old, Pfeiffer is funny, precocious, very charming, and wise beyond her years. She loves dresses with flowers, Barbies, and all things girly. She is also partially paralyzed, a result of transverse myelitis—a rare neurological disorder caused by inflammation of the spinal cord.

Because there was no operation that could help, her recovery depended largely on how well she responded to therapy. And the best place to go, doctors told her parents, was the International Center for Spinal Cord Injury at Kennedy Krieger.

Her therapists offered hope that recovery from paralysis was possible through activity-based restorative therapies (ABRT), exercises that focus on prompting cells to “remember” how to move while encouraging the growth of new nervous system cells. The goal for Pfeiffer was to restore sensation, movement, and independence.

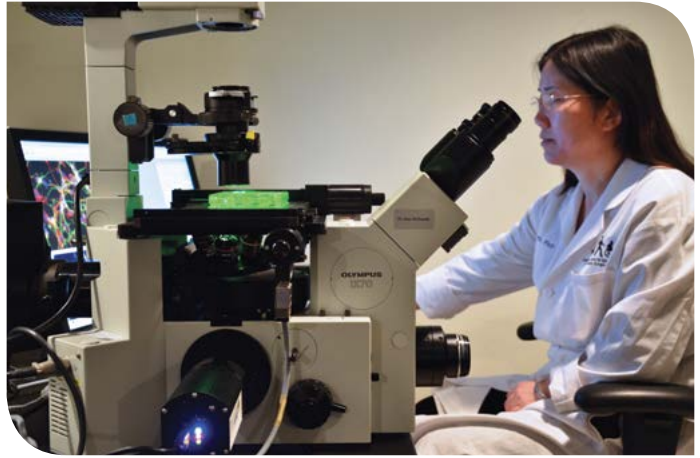
Pfeiffer's therapy soon began paying off—she progressed from walking with a walker to walking with forearm crutches, to a cane, then finally to walking without an assistive device for short distances. For Pfeiffer's family, all of her milestones were like witnessing “little miracles.”

Pfeiffer is a determined little girl who has made much progress, and her parents trust the center to continue guiding Pfeiffer's care as she grows. “Kennedy Krieger and the International Center for Spinal Cord Injury are pioneers in transverse myelitis and spinal cord injuries,” says Pfeiffer's mom. “They know what to expect as a spinal cord-injured child grows and progresses. Every time I go there I find out what's coming down the road. We're ahead of the game, rather than just waiting for something to happen and reacting.”



Research Initiatives

Our team is also committed to advancing spinal cord injury therapies through ongoing clinical and laboratory research. Evidence suggests that the center's activity-based restorative therapies work. The next step for our physicians and therapists is to document this success in trials involving both adult and pediatric patients. Preliminary trials in both populations are underway. At the same time, the center's scientists are also researching the biological mechanisms for how and why activity-based restorative therapies and functional electrical stimulation improve function and whether certain genetic conditions make recovery from spinal cord injury more likely, thus paving the way for the development of drug and other therapies to promote cell regeneration.



To learn more about current research efforts, publications, and clinical trials, visit spinalcordrecovery.org.

Contact Information

For more information or to schedule an appointment, please call **443-923-9222** or toll-free at **888-923-9222**.

TTY: **443-923-2645** or Maryland Relay **711**

Referral specialists are available:
Monday – Friday, 8:30 a.m. – 5 p.m.

Mailing Address:
707 North Broadway
Baltimore, MD 21205

Visit spinalcordrecovery.org

Kennedy Krieger Institute recognizes and respects the rights of patients and their families and treats them with courtesy and dignity. Care is provided in a manner that preserves cultural, psychosocial, spiritual and personal values, beliefs, and preferences. We encourage patients and families to become active partners in their care by asking questions, requesting resources, and advocating for the services and support they need. 3/2015



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Our Mission

At Kennedy Krieger Institute, we dedicate ourselves to helping children and young adults with disorders of the brain, spinal cord, and musculoskeletal system achieve their potential and participate as fully as possible in family, school, and community life.