

**SUNY** Downstate Department of Orthopaedic Surgery and Rehabilitation Medicine is the leading provider of musculoskeletal care in Brooklyn, a preeminent academic facility for musculoskeletal education, and a center for cutting-edge musculoskeletal research. The Human Performance Laboratory is the only one of its kind in Brooklyn.

Clinically, we offer movement evaluations for people with neuromuscular and musculoskeletal disorders as well as sports injuries. With multiple medical specialties available under one roof, we are able to provide comprehensive care for our patients.

Through our research efforts, we study and devise treatment protocols for conditions ranging from cerebral palsy to multiple sclerosis. Our results are shared through presentations, lectures, courses and peer-reviewed publications.

**Future research projects include:**

- ◆ An investigation of balance: Injury prevention through the prediction and avoidance of falls.
- ◆ An examination of the effects of total joint replacement on the other joints of the body.
- ◆ A study of the effects of spinal fusion on mobility after surgery.

As an internationally recognized teaching hospital, our goal is to educate the next generation of human motion scientists and clinicians.

Call for an Appointment or Additional Information:  
(718) 270-4540

450 Clarkson Avenue, Box 30, Brooklyn, NY 11203

SUNY  
**DOWNSTATE**  
Medical Center  
University Orthopaedic Associates



STATE - OF - THE - ART  
**MOTION ANALYSIS**  
FOR MOVEMENT DISORDERS

**Motion Analysis Benefits Adults and Children With a Variety of Orthopaedic Problems**

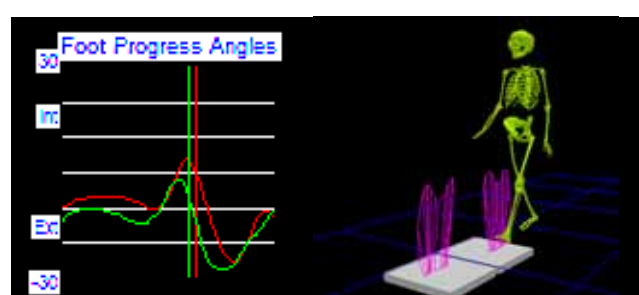
**Neuromuscular Disorders**

- Cerebral Palsy
- Spina Bifida
- Stroke
- Multiple Sclerosis
- Balance Disorders
- Congenital Abnormalities
- Peripheral Nerve Injuries
- Brain & Spinal Cord Tumors
- Traumatic Brain & Spinal Cord Injury

**Bone & Joint Disorders**

- Sports Injuries
- Joint Replacement
- Amputees/Prosthetic Function
- Joint Injuries Affecting Gait & Posture

Using a state-of-the-art Vicon Motion Analysis System, we study how different parts of the body interact when they are in motion. Via seven high-speed MX-13 cameras, digital video, force plate analysis and dynamic electromyography, we record normal and pathological motion in three dimensions. The resulting information allows us to objectify changes in motion and gait before and after interventions such as orthopaedic surgery, physical therapy, occupational therapy, spasticity management or alternative modalities.



**• Kinematics**

By tracking anatomically placed reflective markers with seven different cameras, we mathematically quantify the motion of a person in real time. Skeletal renderings and graphs generated by an animation computer program allow us to examine



the activity of the muscles and joint angles during movement.

**• Kinetics**

Through force plates in the floor, we measure ground reaction forces, the amount of pressure applied against the foot as it touches the ground. We also examine the power generated at the joints. This is an important tool in comparing healthy and abnormal gait.



**• Dynamic Electromyography**

16 channels of surface EMG data measure muscle activity in real time, differentiating the action of each muscle and determining its contribution to disability.

*"It's one of the most intelligent and scientifically-generated treatment programs available for movement disabilities."—Dr. Charles Spero*

**Charles Spero, MD, Medical Director**, is internationally renowned for his work with cerebral palsy, club foot and trauma patients. *Clinical Associate Professor of Orthopaedic Surgery and Director of Pediatric Orthopaedics* at SUNY Downstate Medical Center, Dr. Spero is a member of the Pediatric Orthopaedic Society of North America, the American Academy of Orthopaedic Surgeons and the American Academy of Cerebral Palsy and Developmental Medicine. He has authored several textbooks and has had articles published in *The Journal of Bone & Joint Surgery*, the *Journal of Pediatric Orthopaedics* and the *Journal of Orthopaedic Trauma*. After earning his medical degree from George Washington University, Dr. Spero completed his residency in orthopedic surgery at Lenox Hill Hospital and a fellowship in pediatric orthopaedic surgery at the Hospital for Special Surgery.



**Ellen Godwin, PT, PhD, PCS, Clinical Director**, earned her Bachelor's Degree in Physical Therapy at Hunter College, her Master's in Physical Therapy with a specialization in pediatrics at Long Island University, and her Doctorate in Physical Therapy at Nova Southeastern University in Ft. Lauderdale. Dr. Godwin has conducted workshops and given presentations across the country on topics such as spasticity management; gait analysis and surgical planning in cerebral palsy; the use of BOTOX in children; and physical activity and nutrition for individuals with developmental disabilities. She has also offered her expertise in an advisory capacity, consulting on cerebral palsy, motor disabilities, Down syndrome and physical therapy services for children with neuromuscular and orthopaedic conditions. Dr. Godwin is *Adjunct Associate Professor in the Division of Physical Therapy* at Long Island University, and is a member of the Gait and Clinical Movement Analysis Society and the American Academy of Cerebral Palsy and Developmental Medicine.



**LOCATION**

SUNY Downstate Medical Center  
University Hospital of Brooklyn  
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Lower Level, Room ALL 1-460  
Brooklyn, NY 11203  
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