Identify, treat and document the physical impairments that cause functional limitations.
For more than 30 years the System 4 continues to be the choice of the most distinguished clinics and research facilities worldwide.

**Technology**
Featuring six modes of operation, the System 4 offers pioneering breakthroughs in neuromuscular testing and rehabilitative technology.

**Phases of Rehabilitation**
The System 4 allows for six phases of rehabilitation following the model of proving need, progress, and outcome.

**Advantage Software**
Comprehensive, easy-to-use, feature-rich software for human performance testing and rehabilitation. Now with enhanced features.

**Versatility**
System 4 is dependable and versatile – providing the means to take on new challenges and be adaptable to keep pace with progressive thinking and innovation.

**Education and Support**
Biodex education programs are designed to ensure clinicians are aware of current developments, and to help understand and utilize the system.

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**TECHNICAL BRIEF**
**MODERN ROBOTIC DYNAMOMETRY**
*Bill Galway, Business Development Manager, Biodex Medical Systems, Inc.*

The dynamometer is experiencing a new resurgence as the need for objective data and the markets for which it serves expand.

Read the full story at [www.biodex.com/roboticdynamometry](http://www.biodex.com/roboticdynamometry)
Distinguish Yourself
For people who know the difference
The Technology

Based on accepted science, backed by independent studies, supported by clinical protocols and normative data.

Neuromuscular testing and rehabilitation technologies
Unusually sensitive to patient’s limits.
- Progressive and interactive features assuring complete control.
- Dynamic and static muscle loading environments provide unlimited combinations of technique and application.

Isokinetic Resistance Mode
Completely accommodating throughout the entire range of motion
- Resistance continuously matches effort, accommodating to variations in patient force output due to weakness, pain or fatigue at specific points in the individual’s range of motion.
- By identifying the area that is weak, a targeted rehabilitation program can be designed. Targeting and concentrating on the impairment allows a faster, measurable recovery.
- The unique impact-free acceleration and deceleration eliminates joint trauma, allowing exercise and testing at more functional speeds.
- Applied torque response ensures limb velocity increases or decreases in proportion to the torque applied during acceleration and deceleration, enabling neuromuscular control measurements.
- Choose concentric and eccentric contractions to perform isolated plyometric exercises.
  - Concentric torque up to 500 ft-lb (680 Nm)
  - Eccentric torque up to 400 ft-lb (542 Nm)

Passive Motion Mode
Multi-function modality
- Unique control properties allow for early intervention throughout all phases of rehabilitation.
- Passive speeds can be set as low as .25 degrees per second and as fast as 300 degrees per second.
- Ideal for proprioceptive testing – Active joint position testing stimulates joint and muscle receptors and provides a functional assessment of afferent pathways.

Isometric Mode
Effectively develop strength and decrease joint effusion
- Commonly used pre- and post-operatively or when pain associated when motion is a factor.
- Work the agonist, antagonist or both muscles at specified joint angles.

Isotonic Mode
Restore function
- Allows velocity to vary while providing inertia-free constant force and concentric or eccentric muscular contractions.
- Higher performance
  - Isotonic force as low as .5 ft-lb (.7 Nm) = 6 inch pound; and as high as 400 ft-lb (542 Nm)
- Selecting force provides protective pre-loading of the joint prior to movement.

Reactive Eccentric Mode
For submaximal neuromuscular re-education in early phases of rehabilitation
- Patient must produce and maintain a pre-determined minimum force output to initiate movement, loading the muscles surrounding the joint, producing pre-load, thus stabilizing and protecting the joint.
- Eccentric torque up to 400 ft-lb (542 Nm).

Customized Motor Control
Optional Researcher’s Tool Kit
- Ability to apply position based customized motor control and data export.
- Export Data Parser produces .csv files with preformatted header.
CASE STUDY

DRUMMER’S SHOULDER GETS IN TUNE

Toni LaBarbiera, PT, Rick Lemus, LPTA. Ultimate Rehab in Ridgewood, NJ,

Biodex Multi-Joint System helps improve American jazz/fusion drummer Lenny White’s shoulder weakness. Ultimate Rehab in Ridgewood, NJ applies an integrated approach to Lenny’s treatment resulting in a strongly positive outcome.

Read the full story www.biodex.com/s4/casestudies
Six Phases of Rehabilitation

1. Healing Constraints and Proving Need
In Passive Mode, gentle range of motion exercise can facilitate the healing process and restore normal range of motion necessary for function. Isometric mode allows safe, comfortable strengthening and testing at specified angles that are safe for both your pre- and post-operative patients.

2. Controlling Joint Effusion/Inflammation
Utilizing the Passive Mode with other modalities allows the structures around the joint to work as a pump to move blood, lymph and waste products out of the joint. System 4 has the capability to move the limb as slow as .25 degrees per second and with force capabilities as low as .5 ft-lb.

3. Restoring Range of Motion
Controlling the System 4 through the GUI interface in Passive Mode allows range of motion to be restored by gradually increasing range of motion “on the fly” in a specified direction, at appropriate speeds and safe torque levels.

4. Restoring Strength and Proving Progress
Isometric, active assistive, submaximal concentric, eccentric contractions are early strengthening techniques that are available to the System 4 user. More progressive maximal concentric, eccentric contractions are available in Isokinetic, Isotonic, Passive and Reactive Eccentric modes. These modes are also suitable for testing and delineating a documentable progression of muscular strength, endurance and joint position sense.

5. Restoring Function
Isokinetic concentric / concentric mode allows for safe exercise at speeds which approximate function. Impact and inertia-free Isotonic Mode allow muscles to contract exactly as they would perform during functional activities. Proprioception, muscular acceleration and deceleration are also activities that are addressed with the Biodex System 4.

6. Proving Outcome
All five modes can objectively assess isolated joint muscle strength and neuromuscular control.

RESEARCH STUDY
STRENGTH IMBALANCES AND PREVENTION OF HAMSTRING INJURY IN PROFESSIONAL FOOTBALL PLAYERS
Jean-Louis Croisier, PhD, PT, Sebastien Gantois, PT, Johnny Binet, PT, Marc Genty, MD, and Jean-Marcel Ferret, MD From the Department of Motricity Sciences and Rehabilitation, University and CHU of Liege, Belgium, the Clinique Valmont Genolier, Glion, Switzerland, and the Center of Sports Medicine, Lyon-Gerland, France

Researchers investigate the isokinetic intervention as a preseason screening tool in professional football players in predicting hamstring muscle strain and reducing incidence of hamstring injury.

Read the full study at www.biodex.com/study/hamstring/croisier
Advantage Software™

Simple. Logical. Intuitive.

Motivate patients with on-screen charts and graphics, tracking performance and encouraging compliance with a rehabilitation plan.

Touch Screen for quick, easy operation
Easy to follow, onscreen wizard guide beginners
A Windows® based application provides flexibility for advanced users

On-demand audio and visual aids demonstrate exercise and test patterns.

Communicate need, progress and outcome, clearly and accurately
- Export manager produces files with preformatted Excel headers.
- All reports can be printed as PDF’s for EMR attachment.

Isomap
A graphical depiction and quantitative analysis of strength that includes all measures of force, velocity and range of motion. The map allows the clinician to easily examine regional impairments of neuromuscular function and design a specific rehabilitation treatment.

Rehabilitation Progress Report
Unique to the System 4...on-screen chart and printable reports.

▲ Capture and document every step of the rehabilitation process with Advantage Software.

- Tracks pain, range of-motion and strength throughout the rehabilitation protocol.
- Four other parameters (not necessarily from the System 4) can be entered to present status and progress.
- Stored for easy reference. Printable for referring physicians and third party payers.
NEW

- **Enhanced Data Export Utility** allows users to download all patient test information at one time, including both calculated and raw data.
- **Exported Data Parser** makes it simple to convert .csv files into a report format.
- **Expanded and updated isokinetic normative data** is available for multiple joints, including data from pediatric, age 6 -13 years through adults to age 83.

www.biodex.com/s4

www.biodex.com

1-800-224-6339
Internat’l 631-924-9000

Biodex
The Markets

Highly Versatile.

System 4...Sensitive enough for the lowest and discrete measurement demands of researchers with more than enough power for world class athletes.

- **Sports and Orthopedic Medicine**
  - Provide the best outcomes.
  - Shoulder Dysfunction
  - Knee Osteoarthritis
  - Lateral Ankle Sprains
  - Patellofemoral Dysfunction
  - Anterior Cruciate Ligament
  - Preseason screening, injury prevention and athletic performance enhancement.

- **Research**
  - Used in over 1,000 published studies.
  - Analog Signal Access Interface
    - Provides real-time analog voltage output of torque, position and velocity from the dynamometer. Perfect for integration with EMG devices.
  - Customized Motor Control
    - Through the use of the Researcher’s Tool Kit, the advanced user has the ability to control the dynamometer with a position-based pattern.
  - Curve Analysis
    - Allows the user to conduct complete neuromuscular evaluation.

- **Neurorehabilitation**
  - Helps patients build strength, endurance and coordination. Spasticity management includes objective quantification at specific contraction.
  - Passive mode is used for repetitive exercises.
  - Eccentric mode is useful for controlled strengthening.

- **Pediatrics**
  - Used to treat children worldwide.
  - Isokinetik muscle testing provides objective data for neuromuscular control and strength.
  - Pediatric attachments and age-based normative data are available.

- **Older Adult**
  - Objective testing and training for balance disturbances.
  - Isokinetik testing will identify weakness.
  - Exercise improves ankle and leg strength.

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**CASE STUDY**

**BRAZILIAN NATIONAL FOOTBALL TEAM**

*Luiz Alberto Rosam - Physiotherapist, Brazilian National Football Team*

The Brazilian Football Club is using the System 4 to increase player longevity, reduce injuries, better quantify deficits and generate reports that note improvement, show where more work is needed and motivate athletes to increase strength – all part of staying at the top of their game and the top of the scoreboard.

Read the full story at [www.biodex.com/s4/casestudies](http://www.biodex.com/s4/casestudies)
INTERACTIVE eLearning
Accessing the Biodes online eLearning Center is fast and easy, simply go to www.biodes.com/elearning, check on the REGISTER button and follow the directions.
Education & Training

Biodex is your long-term partner in the development of positive outcomes.

Biodex University
Established to educate clinicians on the application of Biodex Physical Medicine products.

Biodex combines science with practical application to present a series of eLearning modules, hands-on workshops, evidence-based clinical protocols, training webinars and on-site training all designed to help you better understand and utilize your System 4.

Interactive eLearning Modules
Designed to improve product utilization and increase clinical value. Specific tutorials provide training on how to setup the System 4, navigate the software, perform testing and interpret results. Provides the convenience of learning at your own pace.

Visit www.biodex.com/elearning for more information.

Hands-on Workshops
Biodex provides on-going Application Training Workshops for System 4 owners. These full-day workshops include practical hands-on hardware and software training and are useful for both beginner and intermediate users.

Visit www.biodex.com/clinmed to learn more and view the current list of workshops.

Clinical Protocols
A series of evidence-based clinical protocols focused on the rehabilitation of specific conditions using the System 4. Learn how to apply the features of the device for:
- Sports and Orthopedic Medicine
- Neurorehabilitation
- Pediatric Medicine
- Older Adult

Visit www.biodex.com/S4clinicalguidelines to read more.

Support

Installation
It all starts upon delivery of your System 4. Biodex devices are installed by certified application specialists and include a one day in-service training program. Step-by-step hands-on training will show you how to use and maximize the System 4 to help meet your specific demands.

Service
Biodex stays with you every step of the way. Phone support and on-site field service allow you to concentrate on treating patients, not your equipment.
Specifications

SYSTEM 4 PRO

System 4 PRO features:
- Touch-screen interface for quick, easy multi-mode operation; isokinetic, isometric, isotonic, reactive eccentric and passive
- Concentric speed up to 500 deg/sec
- Eccentric speed up to 300 deg/sec
- Concentric torque up to 500 ft-lb (680 Nm)
- Eccentric torque up to 400 ft-lb (542 Nm)
- Passive speed as low as .25 deg/sec
  - Passive torque as low as .5 ft-lb
  - Isotonic torque as low as .5 ft-lb

Clinical Data Station:
- Windows™-based PC
- Windows™ Operating System
- Biodex Advantage Software
- LCD Flat Panel Touch-Screen Color Monitor with Integrated Speakers
- Color Printer

Attachments:
- Ankle, knee, shoulder, elbow, wrist and hip
- Attachment cart
- Calibration kit
- Manuals and wall chart
- 64 square feet operating space (6 square meters)

Certifications:
ETL and cETL listed to UL 60601-1, CAN/CSA C22.2
No.: 601-1-M90 and EN60601-1,
CE conformity to M.D.D. 93/42/EEC*

*When sold complete with computer, monitor and printer.

Options to System 4 Pro
- Dual Position Back Extension/Flexion Attachment
- Closed Kinetic Chain Attachment
- Work Simulation Tools
- Anti-Shear Attachments
- Pediatric Attachments
- Wide Seat
- EMG Analog Signal Access Utility
- Researcher’s Tool Kit

SYSTEM 4 QUICK-SET

System 4 QUICK-SET features:
- Touch-screen interface for quick, easy multi-mode operation; isokinetic, isometric, isotonic, reactive eccentric and passive
- Concentric speed up to 500 deg/sec
- Eccentric speed up to 300 deg/sec
- Concentric torque up to 500 ft-lb (680 Nm)
- Eccentric torque up to 400 ft-lb (542 Nm)
- Passive speed as low as .25 deg/sec
  - Passive torque as low as .5 ft-lb
  - Isotonic torque as low as .5 ft-lb

Clinical Data Station:
- Windows™-based PC
- Windows™ Operating System
- Biodex Advantage Software
- LCD Flat Panel Touch-Screen Color Monitor with Integrated Speakers
- Color Printer

Attachments:
- Ankle, knee, shoulder, elbow, and wrist
- Attachment cart
- Calibration kit
- Manuals and wall chart
- 32 square feet operating space (3 square meters)

Certifications:
ETL and cETL listed to UL 60601-1, CAN/CSA C22.2
No.: 601-1-M90 and EN60601-1,
CE conformity to M.D.D. 93/42/EEC*

*When sold complete with computer, monitor and printer.

Options to System 4 Quick-Set
- Dual Position Back Extension/Flexion Attachment
- Closed Kinetic Chain Attachment
- Work Simulation Tools
- Hip Attachment
- Anti-Shear Attachments
- Pediatric Attachments
- Wide Seat
- EMG Analog Signal Access Utility
- Researcher’s Tool Kit

System 4 QUICK-SET

Patient Positioning System with fixed seat height, fully assisted dynamometer height adjustment, front-to-back chair adjustment.
Adjustable contoured seat back
Fully padded adjustable seat for safe comfortable patient positioning
Padded adjustable patient restraints
Dynamometer Head Adjustability
Patient safety shut-off
Touch-Screen monitor can be positioned for easy patient viewing
17” Flat Panel Touch Screen with Graphical User Interface (GUI) provides a versatile platform for future feature capabilities.
On-board color printer
Compact design cart with large flat working surface
Convenient Pause/Resume Button
User Capacity: 430 lb (195 kg)
Color-coded positioning guides
Easy to install attachments
Accepts tower PC configurations, which allows for expanded computer options, as evolving technology may demand.
Locking casters
Over 4,000 Biodex Dynamometers in use worldwide.

**BIODEX PREMIER USER LIST**
...just some of the elite professional teams and facilities who depend on Biodex

**US Pro Teams/Notables**
- Boston Celtics
- Boston Red Sox
- Carolina Panthers
- Chicago Bears
- Dallas Cowboys
- Denver Broncos
- Green Bay Packers
- Houston Rockets
- Indianapolis Colts
- Kansas City Royals
- Los Angeles Dodgers
- Los Angeles Lakers
- New York Rangers
- New York Knicks
- Orlando Magic
- Pittsburgh Pirates
- Seattle Seahawks
- Tennessee Titans
- Texas Rangers
- Toronto Blue Jays

**Colleges/Universities**
- Boston University
- Broome Community College
- California State University Fresno
- Georgia State University
- Indiana State University (KIN)
- Mississippi State University
- Ohio State (KIN)
- Penn State University
- NJ Rutgers University
- University of Alabama
- University of Arkansas
- University of Colorado
- University of South Florida
- University of Texas
- University of Oklahoma

**Medical Centers/Clinics**
- Albany Medical Center
- Andrews Institute
- Baylor Medical Center
- Bellevue Hospital
- Boston Medical Center
- Brooke Army Medical Center
- Cincinnati Sports Medicine
- Cleveland Clinic
- HealthSouth Rehab Hospital
- Hospital for Special Surgery
- Hospital for Joint Diseases
- Jones Memorial Hospital
- Kaiser Foundation
- Kessler Institute
- Life Care Centers of America
- Mayo Clinic Health System
- Naval Hospital
- Penn State Milton S. Hershey Medical Center
- Pinnacle Physical Therapy
- Rehab Institute of Chicago
- Robert Wood Johnson University Hospital
- Rusk Institute
- Spaulding Rehabilitation Hospital
- Sports Concussion Institute
- Texas Children’s Hospital
- Walter Reed Army Medical Center

**International Elite Football Users**
- Arsenal F.C.
- Aston Villa F.C.
- Blackburn Rovers
- Benfica
- Brazilian National Football Team
- Everton F.C.
- French National Football Team
- Glasgow Celtic F.C.
- Manchester City F.C.
- Napoli F.C.
- Palmeiras
- Santos F.C.

...and many many more