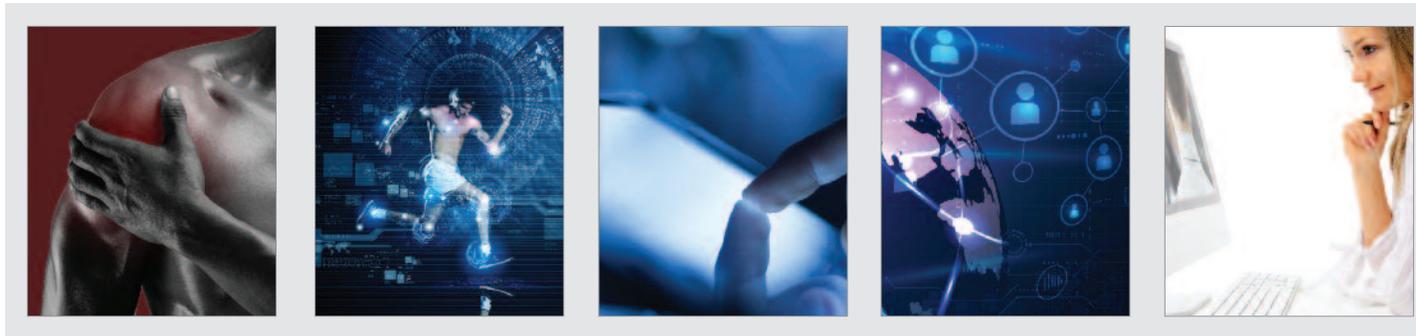


System4

DYNAMOMETER

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.



TECHNICAL BRIEF

MODERN ROBOTIC DYNAMOMETRY

Bill Galway, Business Development Director, 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

Distinguish Yourself

For people who know the difference



BIODEX

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.



www.biodex.com/s4



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

BIODEX

www.biodex.com/s4



Six Phases of Rehabilitation

Following the model of proving need, progress, and outcome.

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.

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.

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.

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.

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.

6. Proving Outcome

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



CASE STUDY

BRAZILIAN NATIONAL FOOTBALL TEAM

Luiz Alberto Rosan - 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

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, on-screen wizard guides beginners.
- Advanced features provide flexibility for more experienced users.

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

Communicate need, progress and outcome, clearly and accurately

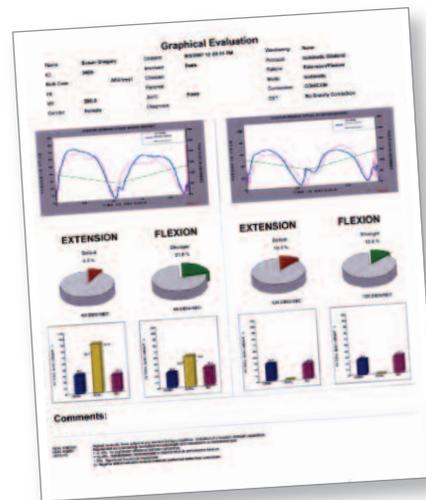
- Export manager produces files with preformatted Excel headers.
- All reports can be printed as PDF's for EMR attachment.

Isomap - Graphical Imaging Software

This optional report generation utility provides 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 identify 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.*
 - **Hamstring Injury Risk Management** offers objective testing that isolates muscle-performance data. Test results, combined with established targeted outcomes, can be used for pre-emptive injury screening, managing rehabilitation and determining readiness for return to play.
- **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 through adults, ages 5-83.

**Suitable for System 2, 3 and 4*

BIODEX

Expand the use of your Biodex Dynamometer

NEW Upper Extremity Attachments to accommodate hemiparetic patients



Adaptable for System 3 and System 4 dynamometers, these lightweight, carbon-fiber attachments promote neuro recovery and improve strength, accommodating the impaired grasp associated with hemiplegia. The eccentric mode is especially useful for controlled strengthening.



Visit www.biodex.com/s4/ue for more details.

Specially designed pediatric attachments



Isokinetic muscle testing on children helps clinicians by providing objective data for neuromuscular control and strength.

Rehabilitate Hamstring Strains with **NEW** Software



Objective testing provides valuable, isolated muscle-performance data for pre-emptive injury screening, managing rehabilitation and determining readiness for return to play.

Visit www.biodex.com/hamstring for more details.

Upgrade path available for existing System 4 and System 3 dynamometers.

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.

- Hamstring Injury
- Shoulder Dysfunction
- Knee Osteoarthritis
- Lateral Ankle Sprains
- Patellofemoral Dysfunction
- Anterior Cruciate Ligament
- Preseason screening, injury prevention and athletic performance enhancement

- **Workplace Health**

- Helps employers gauge physical competence of applicants
- Reduces injury and workers' compensation claims
- Objective measurement for pre-employment testing as outlined by the Department of Labor

- **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 optional 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.

- **Military Strength Training**

- Used by military special forces for injury prevention and performance optimization.
- Strength testing identifies residual deficits and predisposition for repeat injury.

- **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.
- Specially designed upper extremity attachments for hemiparetic patients promote neuro recovery and improve strength.

- **Pediatrics**

- Used to treat children worldwide.
- Isokinetic 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.
- Isokinetic testing will identify weakness.
- Exercise improves ankle and leg strength.



RESEARCH STUDY

STRENGTH IMBALANCES AND PREVENTION OF HAMSTRING INJURY IN PROFESSIONAL FOOTBALL PLAYERS

Jean-Louis Croisier, PhD, PT, Sebastien Ganteaume, 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/research/hs213/16054

BIODEX



INTERACTIVE eLearning

Accessing the Biodesign online eLearning Center is fast and easy, simply go to www.biodesign.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/clined 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/system4protocols 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.

BIODEX

Specifications

SYSTEM 4 PRO™

220 volt required

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® 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.

Warranty:

One year parts and labor



Options to System 4 Pro

- **NEW** Hamstring Attachment
- **NEW** UE Hemiparetic Attachments
- 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
- Isomap Graphical Imaging Software

SYSTEM 4 MVP™

220 volt required

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® 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
- 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.

Warranty:

One year parts and labor



Options to System 4 MVP

- **NEW** Hamstring Attachment
- **NEW** UE Hemiparetic Attachments
- 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
- Isomap Graphical Imaging Software

SYSTEM 4 QUICK-SET™

220 volt required

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® 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.

Warranty:

One year parts and labor



Options to System 4 Quick-Set

- **NEW** Hamstring Attachment
- **NEW** UE Hemiparetic Attachments
- 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
- Isomap Graphical Imaging Software



SYSTEM 4 PRO™

Patient Positioning System with motorized seat height, front-to-back chair adjustment, fully assisted dynamometer height adjustment, and side-to-side adjustment.



SYSTEM 4 MVP™

Patient Positioning System with fixed seat height, front-to-back chair adjustment, fully assisted dynamometer height adjustment, and side-to-side adjustment.



SYSTEM 4 QUICK-SET™

Patient Positioning System with fixed seat height, fully assisted dynamometer height adjustment, front-to-back chair adjustment.



User Capacity:
430 lb (195 kg)

Adjustable seat height

Adjustable seat position

Color-coded
positioning
guides

Easy to install
attachments

On-board
color printer

BIODEX

Accepts tower PC configurations,
which allows for expanded computer
options, as evolving technology
may demand.

Locking casters

Convenient Pause/Resume Button

17" Flat Panel Touch Screen with
Graphical User Interface (GUI)
provides a versatile platform for
future feature capabilities.

Touch-Screen monitor can be positioned
for easy patient viewing

Dynamometer Head
Adjustability

Compact design
cart with large
flat working
surface

Fully padded adjustable
seat for safe comfortable
patient positioning

Padded adjustable
patient restraints

Adjustable contoured seat back

System 4 PRO shown

More than 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

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.
United Arab Emirates Football Association,
Dubai

Colleges/Universities

Boston University
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

Andrews Institute
Baylor Medical Center
Brooke Army Medical Center
Cincinnati Sports Medicine
Cleveland Clinic
HealthSouth Rehab Hospital
Hospital for Special Surgery
Hospital for Joint Diseases
Kaiser Foundation
Kessler Institute
Mayo Clinic Health System
Naval Hospital
Penn State Milton S. Hershey Medical Center
Pinnacle Physical Therapy
Rehab Institute of Chicago
Rusk Institute
Spaulding Rehabilitation Hospital
Texas Children's Hospital
Walter Reed National Military Medical Center
...and many many more

BIODEX

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