Biodex System 4 Strikes Tone with Athletes, Doctors, Trainers

Summit Medical Group

From left to right, Samantha Zimmerman, Dr. John Hurley, MD and PJ Ritter consider the Biodex Multi-Joint System 4 a significant tool for shoulder and knee rehabilitation. “The big advantage,” according to Hurley, “is that in addition to testing, it allows for muscle strengthening using isokinetic resistance exercises where the joint pushes against a constant resistance at varied speeds.”

Jersey Sports Medicine and Rehab in Morristown, NJ, is part of Summit Medical Group (SMG), and specializes in orthopedic and sports-related rehabilitation.

“It really is busy around here most days,” explains Michael Dunne DPT, ATC, as he greets yet another rehab patient entering the room. “Each therapist sees a full case load, but we don’t mind the full schedule. Our philosophy here is that everyone is getting back to something - football, tennis, volleyball, soccer, golf, lacrosse, running, walking upstairs, etc. When it’s busy here, that just means a lot of people are getting closer to their goals.”

“We use it for baseline testing of knee and shoulder patients, to educate patients about their specific injuries in terms of strength and progress, and to build strength with post-operative knee and shoulder patients. It’s also a great motivational tool.”

According to Ritter, it really helps to explain to knee and shoulder patients exactly what they are recovering from, and how their rehabilitation will progress over time. Discussing strength deficits and bilateral comparisons helps, of course, but showing patients actual numbers generated on the Biodex Multi-Joint System 4 really drives home the talking points and allows patients to see improving results charted from week to week.

“When we do a Biodex baseline test and then follow-up with a progress report, we can say to the patient: ‘Look, there is a 25% decrease in muscle strength at this point in your range of motion and here’s what we need you to do to make this better.’ It’s really impressive when you can see quantifiable numbers and graphs, especially if you come back a few weeks later with a progress report and show that the patient that deficit has decreased to 15%. ‘Come on,’ we’ll tell them, ‘if you can get that bilateral deficit to 10%, we can talk about getting you back on the field!’ Tell that to just about anyone - athlete or not - and they’ll keep pushing forward.”

Quad Strength

To increase the chances of successful and safe return to sport after ACL reconstruction, specific criteria have been developed. Studies have shown that healing time and certain factors, including more symmetrical quadriceps strength prior to return to sport reduces the re-injury rate. Decreased quad strength is a great predictor for decreased function after ACL reconstruction.

The objective test protocols offered with the Biodex System 4 provide valuable, isolated muscle-performance data. Test results, combined with established targeted outcomes, can be used for strengthening the quadriceps and aid with the return-to-sport decision.

Knee Extensions

“The great concern about the safety of OKC knee extensor training in the early period after ACLR may not be well founded.” (Morrissey MC 2000). There are two easy ways in which you can modify knee extensions to ensure limited/reduced strain on the ACL when using knee extensions:

1. Limit the range to 90° - 40°.
2. Put the shin pad more proximally (move it mid-shin instead of distal shin).

The tensile force on the ACL is approximately half when the resistance pad is positioned mid-shin vs. by the ankle (Pandy MG 1997).

Each patient has a unique recovery. In this article, Mr. Treubig describes how knee extensions play a big role in providing his patients with increased quad strength, and regain it quicker. Download the article for his specific protocol on how he progresses patients using knee extensions beginning the 4-6 week mark.

Knee Extensions

Why You Should be Using Knee Extensions After ACL Reconstruction

Dennis Treubig

“One piece of the equation I consider especially important is our Biodex Multi-Joint System. I really like it for the isokinetic capability, but I use it in the other modes as well. It is very useful as an exercise-based rehabilitation tool. I was always taught that exercise is the most important part of physio, and this is one of the few machines with a plug that actually provides exercise modality.

The Biodex Multi-Joint System is especially well suited to producing numerical data in terms of isolated muscle strength. The numbers generated during isokinetic tests have significant meaning and serve as pointers to help show where an injured patient is in terms of stability control and muscular control, providing insight as to when a patient can safely progress to more functional activities or even return to play.

Isokinetic testing, strengthening and rehabilitation are for us very much a preparation phase in terms of getting ready for active rehabilitation related to the game. It continues on as we progress through the rehabilitation regime and to actually playing. After the player returns to the field, it is used as a follow-up and strengthening mechanism for one to two years after many types of injury. The system is especially well-suited for lower limb rehabilitation.”

David Fevre, MSC, MCSP, SRP
Blackburn Rovers Senior Physical Therapist for English Premier League Football Club, Blackburn, UK
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REDUCE HAMSTRING INJURY

Biodex System 4 - Test Protocols and Research with athlete-proven results.

★ WHITE PAPER ★

Evolution of a Successful Hamstring Rehabilitation Protocol to Reduce Hamstring Injury Recurrence

Timothy F Tyler, PT, ATC details the compelling research that Nicholas Institute of Sports Medicine and Athletic Trauma (NISMAT) performed over two years. This white paper reexamines current rehab protocols, reviewing evidence-based studies and examining causes of hamstring strain in an attempt to improve current rehabilitation methods.

The orthopedic surgeons and therapists at NISMAT began seriously questioning conventional hamstring rehabilitation strategy. If it was as effective as commonly believed, athletes should not experience the high rate of recurrence reported internationally in a wide range of professional and amateur sports.

As a result of those observations, and those of others who have attempted with different degrees of success to reduce recurrent hamstring injury, the NISMAT team has developed a new lengthened-state eccentric dynamometer-based rehabilitation strategy for isolating the injured leg, and objectively determining when an athlete is ready to return to play. That protocol has been validated with a prospective 50-subject peer reviewed study in which all compliant patients have been free of recurrent hamstring injuries at least two years later.

Read the full study
www.biodex.com/wp/16134
VERSATILITY & ADAPTABLE

More than 30 years have passed since Biodex introduced the world’s first multi-mode computerized robotic dynamometer.

That event and subsequent “firsts” have made the Biodex System 4 the dynamometer of choice in the most distinguished clinics and research facilities around the world.

Sports and orthopedic medicine, pediatric medicine, neurorehabilitation, older adult medicine, industrial medicine, and researchers depend on Biodex to provide consistent, accurate, objective data. Objective data that provides the best outcome for their patients... objective data that supports their research... objective data that separates their facility from the rest.

Sports and Orthopedic Medicine
The System 4 ensures that you provide the best outcomes for shoulder dysfunction, knee osteoarthritis, lateral ankle sprains, patellofemoral dysfunction and anterior cruciate ligament. Other capabilities include preseason screening, injury prevention and athletic performance enhancement.

For more product information www.biodex.com/S4

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 study www.biodex.com/roboticdynamometry

NEW DEVELOPMENTS • BEYOND SPORTS MEDICINE

Application – Workforce Performance
Objectively determine the ability to perform an occupation

Application – Warrior Performance
Used by military special forces for injury prevention and performance optimization

Upper Extremity Attachments for Biodex System 3 and 4
Specially designed for hemiparetic patients with upper extremity limitations. The attachments promote neuro recovery aiding to improve quality of life.

Application – Hamstring Strains
Dynamometer software quantifies an athlete’s propensity for injury or reinjury – with objective test protocols. Upgrade paths available for older models.

Advantage Software
Comprehensive, easy-to-use, feature-rich software for human performance testing and rehabilitation.

Now with enhanced features. Upgrade paths available.
Baseline Testing for Concussion Management

Baseline tests are performed on athletes *preseason* to establish an individual athlete’s pre-injury performance.

Today, the proper management of concussion should include baseline of the following:

- Balance Assessment
- Cognitive Assessment
- Graded Symptoms Checklist

The NCAA® and NATA® have identified these as the three essential assessment pillars.

When combined, these preseason baseline tests can provide a comparison point for cognitive function and objectively quantified balance for athletes. In the case of a suspected concussion, it is these baseline tests to which post-injury assessments are compared, providing the objective data necessary to track recovery.

“A decreased ability to maintain balance is one of the hallmark signs of concussion.”

The Biodex Balance System SD has been designed to meet the needs of everyone looking to improve balance, increase agility, develop muscle tone and treat a wide variety of pathologies. Featuring easy-to-follow “touch-screen” operation, the Balance System SD is simple to learn and operate, leading the user step-by-step through testing protocols and training modes in both static and dynamic formats. Extremely versatile, it is the only system that provides fast, accurate Fall Risk Screening & Conditioning for older adults, closed-chain, weight-bearing assessment and training for lower extremity patients, and adds the objective balance assessment component to a concussion management program.

**Concussion Management**

Biodex Balance Assessment is used for concussion management by high schools, college and professional sports teams to unravel the mystery of concussion and to bring together best practices combining cognitive testing and a graded symptoms checklist in combination with balance assessment.

**Sensory Integration** – Includes the mCTSIB test, the BESS test and the ability to create custom sensory integration and balance tests.

**Bilateral Comparison** – Measures and compares the stability of one leg to the other, used primarily for testing orthopedic injuries.

A great resource for any clinic when addressing sports-related injuries and surgical rehabilitation. Help athletes perform better by demonstrating functional deficits. The Biodex Balance System documents weakness and challenges patients to improve. The various test modes evaluate the athlete in a static or dynamic environment, then generates objective documentation of the results. Reports include standard deviations of target performance, the percentage of time an athlete stays in a particular quadrant and then compares performance to normative data, built into the system. This allows the objective measures of the athlete to be trained and then easily reevaluated and assessed to quantify improvement.

For more product information [www.biodex.com/balance](http://www.biodex.com/balance)
Aurora Sports Medicine Institute uses integrated approach in the Management of Concussion including the Biodex Balance System SD for objective balance assessment.

Aurora Sports Medicine Institute (ASMI) is the sports medicine branch of Aurora Sheboygan Memorial Medical Center, in Sheboygan, WI. As the premiere sports medicine provider in southeastern Wisconsin, ASMI is the premier choice of physically active individuals for preventative and rehabilitative care of orthopedic and sports injuries.

Adam Brill is an Athletic Trainer at ASMI and plays a large role in program development at the institute. He is also the head Athletic Trainer at Plymouth High School in Plymouth, WI, where he is focused on performance enhancement and injury prevention for all their student athletes.

“We knew the general parameters in the management of concussion, but we wanted to develop a formal system and put some strong policies in place,” explains Brill. “We met as an athletic training team to review the Zurich Consensus Statement on Concussion in Sport that was published in 2009. That’s where we drew a lot of our information from. We also had a great team of pediatricians who provided their expertise and who we shared our ideas with.

As a rule, athletes are very competitive and hate to be shown their functional deficits. The Biodex Balance System shows their proprioceptive weakness and challenges them to improve. The Balance System test mode provides a standard baseline to evaluate the athlete in a static or dynamic nature. The computer generates a printout of the standard deviations of correctional mistakes and the percentage of time the athlete stays in a particular quadrant. It then compares this to normative balance data that Biodex has provided. This allows the objective measures of the athlete to be trained, and then easily reevaluated and assessed to quantify proprioceptive improvement.

The Biodex Balance System is the only piece of equipment in our clinic that can objectively measure and compare to normative data the proprioceptive deficits of a patient. It also works well as a simple training tool, providing a challenging and competitive way to motivate athletes.

In my opinion, the Biodex Balance System is a very cost-effective choice of capital equipment for most physical therapy or athletic training facilities. I would highly recommend this product to any orthopedic clinic, athletic training room, rehab clinic or balance clinic because of the true objective measurements and normative data the system offers to both patient and clinician.”

Lance Kelly, MPT, ATC
Hughston Rehabilitation, Hughston Clinic, P.C.
Columbus, GA

Read the full study [www.biodex.com/casestudy/aurora](http://www.biodex.com/casestudy/aurora)

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### Balance Assessment gets thumbs up from High School Athletic Director

Increase the sensitivity of your concussion evaluations by adding objective *Balance Assessment* - from baseline to post-injury.

Scott Stein is the athletic director and head football coach at Sun Valley High School. “The baseline testing that we’ve done in the last couple of years has been excellent for us as athletic directors and coaches in understanding our kids. The new information that we’re getting – from concussion screening to the equipment that they’re wearing – allows us to get more involved in protecting the lives of the student-athletes that are playing sports for us,” said Stein.

**“Balance testing is going to be a big part of keeping our kids safe and healthy.”**

“The Balance testing for concussion is a big part of understanding when a student-athlete can come back to play safely. It’s come all the way down from professional sports and is now at the high school level. In Union County, balance testing is going to be a big part of keeping our kids safe and healthy.”

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### Upper Body Cycling for Athletes

When an athlete sustains an injury or undergoes surgery, the right equipment can encourage exercise without negatively impacting recovery. The Biodex Upper Body Cycle (UBC) fits this mold perfectly for both upper and lower body injuries.

Considered one of the most versatile devices in the Biodex Kinetic Chain product lineup, this upper body ergometer offers ROM exercise, strengthening and conditioning for a wide range of athletic diagnoses:

- Impingement Syndrome
- Medial and Lateral Epicondylitis
- Ulnar Collateral Ligament Reconstruction
- Multidirectional Instability
- SLAP Lesions
- Pectoralis Tears
- Posterior Glenohumeral Instability
- Acromioclavicular Sprains
- Elbow Dislocations

Because the system is self-powered and self-charging, it can be used virtually anywhere – from clinic to sidelines.

**Range of Motion (ROM)**

Perfect for ROM activity post injury or surgery, the UBC acts like a CPM for the shoulder or elbow. The unaffected arm provides the “push” allowing the affected arm to be exercised in a continuous passive motion. Glenohumeral ROM can be enhanced and maintained through the use of endurance training on the UBC. Elbow ROM can be facilitated and maintained as well.

**Strengthening**

While supporting full ROM, the UBC effectively builds shoulder strength post-injury. Scapulothoracic stability can also be enhanced through muscular endurance activities provided by the UBC. The combination of muscular endurance and strength training enabled by this unique ergometer are key to providing stability of the glenohumeral joint.

**Alternative**

Conditioning for someone with a lower body injury is easily performed on the UBC. Interval “wind sprints” using this system can be effective when an athlete is non-weight bearing or unable to walk or run as a result of an injury or surgery. In the case of a serious lower body injury, the seat can be removed to accommodate a wheelchair while helping to maintain cardiovascular conditioning.