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BIODEX NEWS

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Are Athletes Returning to Sport After COVID-19 More at Risk of Injury?

Bill Galway, Director, International Business Development, Biodex Medical Systems, Inc.

As the world returns to sport after COVID-19 pandemic isolation, there are many questions regarding how time on the sidelines will affect everyone from the athletes, sports medicine professionals, coaches and managers, and even spectators. One primary concern is the health of the athletes as they return to sport from a training cycle that is not familiar to their minds or bodies. A significant question is whether these athletes will experience a higher rate of injury, reinjury and time loss as a result of delayed and potentially compressed workload cycles, not to mention game play.

Events similar to this delay have had deleterious effects in the past. After the 2011 National Football League Lockout the athletes returned to a rash of Achilles tendon ruptures. In Myers, et al. 2011[1] it was noted on average there are eight Achilles tears in a full season of NFL football. In 2011, "following a rapid transition into training camp and preseason practice from the NFL Lockout, 10 Achilles tendon tears occurred over the first 12 days of training camp, with 2 additional injuries occurring in the subsequent 17 days which included the first 2 weeks of preseason competition."

We already have data demonstrating that during the first two weeks of the return of German Professional Football, Bundesliga, players have experienced an increase in soft tissue injuries at a significantly higher rate than the first two weeks of the 2019 campaign. In Mark McGowan's recent 2020 interview of Dr. Joel Mason on Bundesliga injuries,[2] Dr. Mason noted that based on club and league data, the pre-lockdown injury rate per game was 0.27. In 2020, this season's rate climbed to 0.88 in the first two weeks of matches, a 226% increase in the rate of injury. While these sample sizes may be considered small, the results did not go unnoticed.

Australian Rules Football is a concern as it opened its 2020 season in June. During normal times the Australian Football League (AFL) demonstrates a high number of ACL injuries. In North America, delayed season starts or restarts for the National Basketball Association, Major League Baseball and National Hockey League are working through the challenges of beginning competition. Sports medicine professionals should ask what the response must be to dampen the effect of these altered training cycles on the athlete's preparedness from an injury risk management perspective.

Continued on page 2.

Attention: Orthopedic Surgeons

How Do You Define Readiness?

In the world of sports injuries, particularly ACL tears, the costs of reinjury are high. Low-tech rehab tools such as elastic bands and medicine balls are gradually becoming a thing of the past. Data-producing technology is now favored for informing RTP decisions.

Research suggests:

"[T]he ability to generate force quickly is a key factor in muscular performance and a successful RTS. As part of a full examination, bilateral comparisons, unilateral ratios, and comparison to sport-specific/position-specific data is necessary."

(Davies, G. J. et al. Current Review of Musculoskeletal Medicine, 2017)

Continued from front cover.

Are Athletes Returning to Sport After COVID-19 More at Risk of Injury?

What tools are available to properly assess risk of initial injury or reinjury?

Nicol van Dyk, et al.[3] recently published a paper, "There Are Many Good Reasons to Screen Your Athletes" in which the concept of "Odds Ratio" (OR) of injury is discussed rather than prediction of injury. They collected data on 614 subjects and 190 injuries during a Periodic Health Evaluation (PHE). "In the 558 professional football [soccer] players included, more than a third had a musculoskeletal condition requiring follow-up in the form of prevention intervention or treatment."

While deficiencies did not predict which individual would go on to suffer an injury (individual risk), proper assessment and subsequent intervention was integral in reducing the Odds Ratio (group risk) of injury. What can the sports medicine clinician do to decrease the Odds Ratio of injury or reinjury?

1. Periodic Health Evaluations, aka screenings
2. Monitor athlete's workload ratios with your performance professional
3. Use isolated joint testing to screen for musculoskeletal deficiencies
4. If necessary, design an intervention with the goal of reducing the Odds Ratio of injury or reinjury

Return-to-Play After ACL Reconstruction

The current literature is also focused on return-to-play criteria after ACL reconstruction. If we can anticipate a higher rate of injury after competitive sports resume play, ACL injury/reinjury will be a concern. The recommended criteria consistently mentioned regarding RTP after ACL reconstruction are as follows:

- Time
- Isokinetic strength testing: symmetry and hamstring/quadriceps ratios
- Functional test symmetry
- Agility testing
- Psychological readiness

Limb Symmetry Index (LSI) is a good tool for functional assessment for return to play, but we know from Wellstandt et al. 2017,[4] a concomitant isolated joint strength measure is needed to compensate for the LSI's overestimation bias. This could be one explanation for the recent resurgence of isokinetic strength testing after ACL-R. Limb strength symmetry and balanced hamstring to quadriceps ratios are important components of return-to-play criteria shown to reduce reinjury in athletes.

Sports medicine professionals should ask what the response must be to dampen the effect of these altered training cycles on the athlete's preparedness.

> ***"During the first two weeks of German Professional Football, Bundesliga, players have experienced an increase in soft tissue injuries at a significantly higher rate than the first two weeks of the 2019 campaign."***

New reporting capabilities in the Biodex System 4 Dynamometer make it even easier to communicate with patients, doctors, third party payers and employers – adding confidence to the RTP decision.

Returning to sport after a pandemic and even after an ACL reconstruction can be extremely challenging and filled with many unknowns. It is imperative that sports medicine professionals use all of the tools available to them to reduce the risk of injury or reinjury and are armed with the latest evidence and objective measures available.

1. Myers, et al. (2011). "Did the NFL Lockout Expose the Achilles Heel of Competitive Sports?". Jrnl of Sports Physical Therapy.
2. Mark McGowan. "Injury spike? Bundesliga report reveals big threat AFL footballers face." AFL.com. May 23, 2020.
3. Nicol van Dyk, Arnhild Bakken, Stephen Targett, & Roald Bahr (2020). "There are Many Good Reasons to Screen Your Athletes." Aspetar Sports Medicine Journal.
4. Wellstandt, et al. (2017). "Limb Symmetry Indexes Can Overestimate Knee Function After Anterior Cruciate Ligament Injury."

NEW SOFTWARE

Advantage BX™

Setting up a Protocol Based Activity (Knee)

Setting the Range of Motion (Knee)

Performing a two-speed isokinetic protocol based activity on the knee

For more information

NEW REPORT

Research-Based Report in Biodex Software Promotes Safer Return-to-Play After ACL Reconstruction

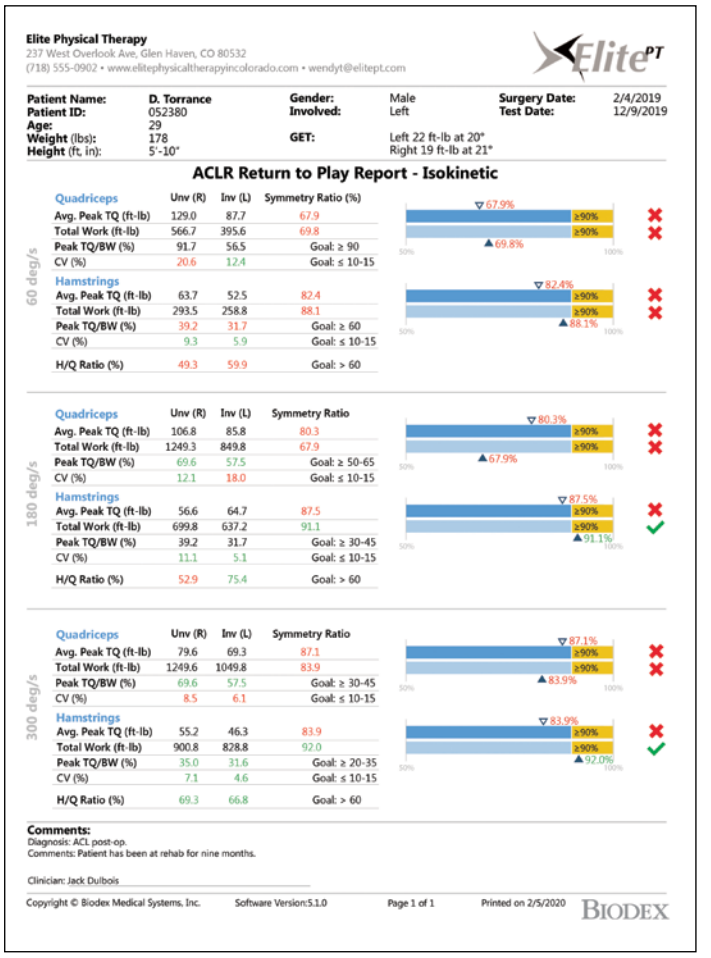
A unique report for System 4 Dynamometer software gives patients and referring physicians the added confidence they are ready to return to play after an injury.

Following up the initial release of NEW Advantage BX software in January, Biodex Medical Systems, Inc. has enhanced the software with new reporting capabilities focused on getting injured athletes back in play safely. The first-ever Return-to-Play report displays isokinetic test results with clear pass/fail to aid in communication with physicians and athletes throughout the athlete's recovery.

The new report is a response to the recent resurgence of isokinetic strength testing after ACL reconstruction. Research has shown strength symmetry and balanced hamstring to quadriceps ratios are major components of return-to-play criteria to reduce reinjury after ACL-R. Other criteria include functional test symmetry, agility testing, psychological readiness, and time. Backed by current research and supported by a panel of experts, the report is designed to give patients and referring physicians the added confidence they are ready to return to play.

"The high failure of ACL reconstruction and the debate of when to return to play is a very active conversation throughout the world," states Ed Behan, Sr. Vice President, Market Development at Biodex. "The new report is a first, and we're grateful to have had so many key opinion leaders participating in its creation."

For more information:
www.biodex.com/acl



Elite Physical Therapy
237 West Overlook Ave, Glen Haven, CO 80532
(718) 555-0902 • www.elitephysicaltherapyincolorado.com • wendyt@elitept.com

Patient Name:	D. Torrance	**Gender:**	Male	**Surgery Date:**	2/4/2019
Patient ID:	052380	**Involved:**	Left	**Test Date:**	12/9/2019
Age:	29				
Weight (lbs):	178	**GET:**	Left 22 ft-lb at 20°		
Height (ft, in):	5'-10"		Right 19 ft-lb at 21°		

ACLR Return to Play Report - Isokinetic

	Unv (R)	Inv (L)	Symmetry Ratio (%)	
60 deg/s				
Quadriceps				
Avg. Peak TQ (ft-lb)	129.0	87.7	67.9	
Total Work (ft-lb)	566.7	395.6	69.8	
Peak TQ/BW (%)	91.7	56.5	Goal: ≥ 90	
CV (%)	20.6	12.4	Goal: ≤ 10-15	
Hamstrings				
Avg. Peak TQ (ft-lb)	63.7	52.5	82.4	
Total Work (ft-lb)	293.5	258.8	88.1	
Peak TQ/BW (%)	39.2	31.7	Goal: ≥ 60	
CV (%)	9.3	5.9	Goal: ≤ 10-15	
H/Q Ratio (%)	49.3	59.9	Goal: > 60	
180 deg/s				
Quadriceps				
Avg. Peak TQ (ft-lb)	106.8	85.8	80.3	
Total Work (ft-lb)	1249.3	849.8	67.9	
Peak TQ/BW (%)	69.6	57.5	Goal: ≥ 50-65	
CV (%)	12.1	18.0	Goal: ≤ 10-15	
Hamstrings				
Avg. Peak TQ (ft-lb)	56.6	64.7	87.5	
Total Work (ft-lb)	699.8	637.2	91.1	
Peak TQ/BW (%)	39.2	31.7	Goal: ≥ 30-45	
CV (%)	11.1	5.1	Goal: ≤ 10-15	
H/Q Ratio (%)	52.9	75.4	Goal: > 60	
300 deg/s				
Quadriceps				
Avg. Peak TQ (ft-lb)	79.6	69.3	87.1	
Total Work (ft-lb)	1249.6	1049.8	83.9	
Peak TQ/BW (%)	69.6	57.5	Goal: ≥ 30-45	
CV (%)	8.5	6.1	Goal: ≤ 10-15	
Hamstrings				
Avg. Peak TQ (ft-lb)	55.2	46.3	83.9	
Total Work (ft-lb)	900.8	828.8	92.0	
Peak TQ/BW (%)	35.0	31.6	Goal: ≥ 20-35	
CV (%)	7.1	4.6	Goal: ≤ 10-15	
H/Q Ratio (%)	69.3	66.8	Goal: > 60	

Comments:
Diagnosis: ACL post-op.
Comments: Patient has been at rehab for nine months.

Clinician: Jack Dulbois

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Physicians can understand report at a glance with clear pass/fail results.

Simple decision rules can reduce reinjury risk by **84%** after ACL reconstruction.

(Grindem, H., et al. British Journal of Sports Medicine, 2016)

View research study

School Sports Are Uncertain – Concussion Safety is Not

Preparing for Baseline Testing After the COVID-19 Lockdown

All test results and training sessions can be stored and printed. Comparison to normative data helps communicate need, progress and outcome.

As the return of school sports remains uncertain, many are concerned about how reduced activity has impacted student athletes. Experts say athletes may be at greater risk of injury, including concussion. If and when sports resume, baseline testing that includes balance assessment will be more important than ever.

Biodex Balance Assessment is used by high schools, college and professional sports teams as an integral part of their concussion management programs. Programs that bring together best practices of cognitive testing and a graded symptoms checklist in combination with objective data provided by Biodex technology.

> *"Objective balance assessment is recognized as part of 'best practice' for concussion assessment and management."*
>
> – International Symposium on Concussion, Consensus Statement

Using the Clinical Test of Sensory Integration of Balance (CTSIB), Biodex Balance devices can independently test all three sensory feedback systems (visual, vestibular and somatosensory).

The objective data generated by either the Balance System™ SD or the portable BioSway™ provides a baseline against which postinjury performance can be compared. In addition, test results from a healthy population of student athletes are stored on the system for general normative data comparison.

Detailed test and progress reports track recovery and provide the medical team with quantitative data to help with the return-to-play decision.

For more information

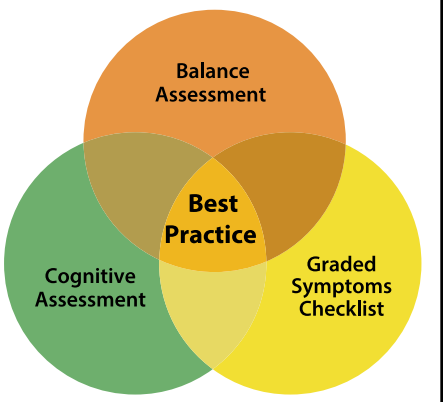
NEW FreeSway™ Handles

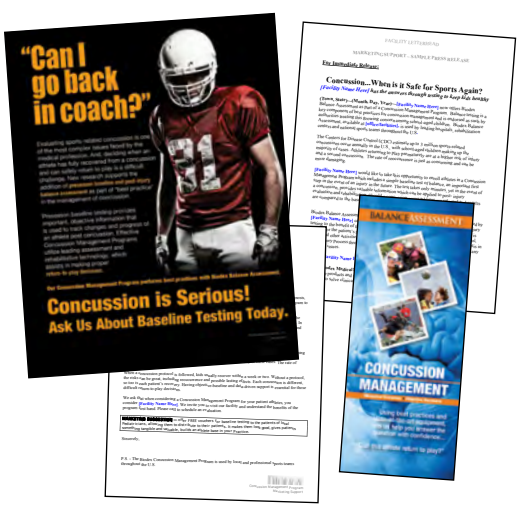
For Balance System SD

It is widely accepted that patients should avoid holding on in order to reap full functional benefits of balance training. Like training wheels for balance, the optional FreeSway Handles "float" to provide security without impeding balance recovery.

BEST PRACTICES FOR CONCUSSION MANAGEMENT

NCAA® and NATA® recommend that baseline tests include a Balance Assessment, Cognitive Assessment and Graded Symptoms Checklist.





Marketing Support Materials

Available exclusively to our customers using Balance Assessment in support of a concussion management program, Biodex provides an assortment of marketing materials to attract athletes, parents, community sports teams, school coaches and athletic directors, as well as referring pediatricians. Materials can be customized to reflect your facility and used to broadcast the role of Balance Assessment in the management of concussion.

- Sample letters • Tri-fold brochure • Sample press release
- Clinical brief • Clinical voucher • Ads for local print publications
- Concussion posters • Scroll sign graphic

BIODEX
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Int'l 631-924-9000

Beyond Sports Medicine:
Getting the Most Out of Your System 4

Sensitive enough for the lowest and most discrete measurement demands of researchers, and with more than enough power for world class athletes, the potential uses for the System 4 goes well beyond ACL rehab. Highly versatile and adaptable, the System 4 Dynamometer is used worldwide on a variety of joints and patient populations.

Neurorehabilitation

Specially designed upper extremity attachments for hemiparetic patients promote neuro recovery. Passive mode enables repetitive exercises. Eccentric mode is useful for controlled strengthening.

Work Simulation

Biodex Work Simulation Attachments replicate job-specific tasks for the hand, wrist, elbow and shoulder, recreating job challenges in ranges of motion, strength and endurance.

Pediatrics

Isokinetic muscle testing provides objective data for neuromuscular control and strength in individuals of all ages. Pediatric attachments and age-based normative data are available.

Sports and Orthopedic Medicine: More Than Just the Knee

Popular for isokinetic knee tests associated with the ACL, also isolates muscle performance data for a variety of sports-related issues: hamstring injury, shoulder or elbow dysfunction, lateral ankle sprains, and patellofemoral dysfunction, to name a few.

Looking for more ways to utilize your System 4?
Contact us to speak to a Biodex product expert.

PEER PERSPECTIVE

Think Beyond Standard Testing

"[A] professional footballer felt he had no option but to retire following multiple hamstring injuries. Traditional strength testing elicited no deficits in hamstring strength (other sources of his hamstring injuries had been investigated and cleared).

"However, I tested him in the standard seating position, prone and also in a 'lengthened state' as pictured. In this lengthened state he had a significant weakness, more than 20% on the affected side for both isometric and eccentric tests. This gave us hope of something new to work on that he hadn't previously done during his rehabilitation. So, we focused on this setup for his rehabilitation.

"The really interesting thing was the player reported that he had never felt the injured aspect of the hamstring working like he felt it during the lengthened state rehabilitation."

Gareth Thomas, Scholars Therapies, UK
Excerpt from "Isokinetic Dynamometry: So Much More Than Isokinetics!" published by Sports Injury Fix

PEER PERSPECTIVE

System 4 Supports Hamstring Protocols

Timothy F Tyler, PT, ATC

The orthopedic surgeons and therapists at the Nicholas Institute of Sports Medicine and Athletic Trauma (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, the NISMAT team 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.

"Our study showed that rehabilitation with an emphasis on eccentric strength training with the hamstrings in a maximally stretched position restored strength and resulted in zero recurrent injuries at an average of two years after return to play. Athletes who did not perform lengthened state eccentric training returned to sport with significant weakness, particularly at long muscle lengths, and had a high recurrence rate (50%)."

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Biodex Medical Systems, Inc.
20 Ramsey Road, Shirley, New York, 11967-4704

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Premier multi-joint system for objective testing. Isolate muscle-performance data for:
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