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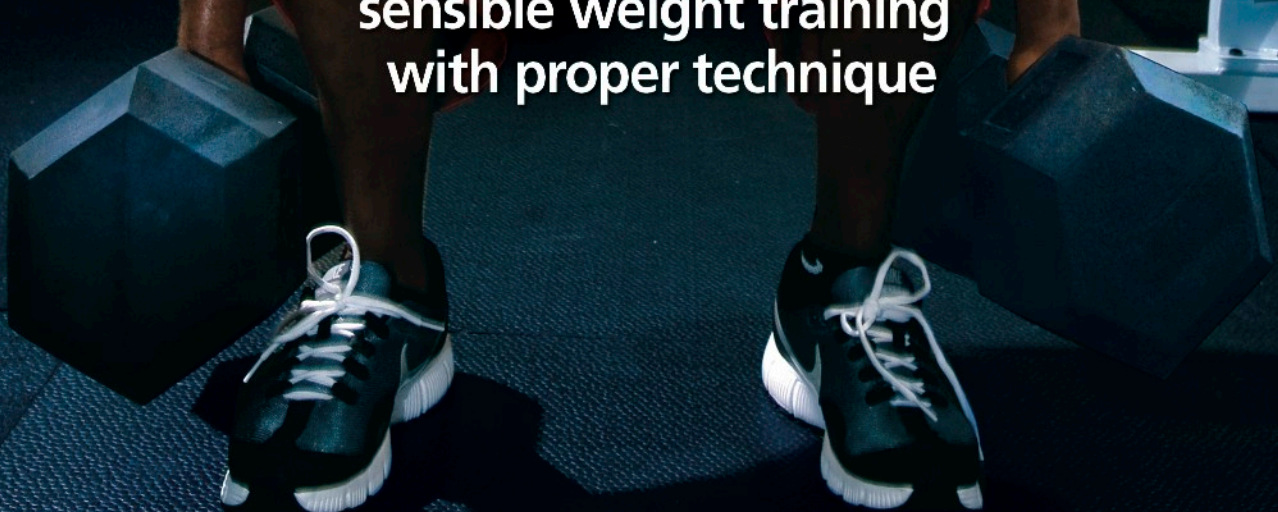
**A New Twist
to Fight
Ankle Sprain**

**Using Lasers
to Improve
Joint Movement**



BRAINS OVER BRAWN

**PT professionals can encourage
sensible weight training
with proper technique**





JOINT BY JOINT



Empowering movement through lasers in sports rehab

By Perry Nickelston, DC

The number-one predictor of an athlete getting injured is history of prior injury. Why? More than likely the athlete was released from care when he no longer had physical symptoms associated with the injury, yet he still had an underlying movement dysfunction that was a ticking bomb for future problems.

Unfortunately, a reduction or elimination of symptoms has nothing to do with condition correction and proper movement function. Athletic performance is first and foremost about proper movement. Recovery and regeneration after an injury is all about re-establishing movement patterns.

Durability and performance cannot be measured in the same manner. There are many athletes who can perform well after an injury, but this has no correlation to how durable a body will be when the person resumes competition. Show me the athlete who can move the best and I will show you the one with the best durability.

In sports rehabilitation, one must begin to evaluate movement patterns and stop chasing the pain. It is our job to get them out of pain, but it is also our obligation to help make them better than they were before getting injured.

Mobility, Stability

What are two key areas to evaluate in order to help them move better? Ankle and hip. Check for both proper mobility and stability. Mobility in terms of human movement is a measure of the ability of a joint or series of joints to move through a range of motion. Stability represents body control through strength, coordination, balance and efficiency of movement; stabilization is the control of mobility. Mobility must first be established before you can have adequate stability. Every joint has a little of both. However, some joints are meant to be more mobile and some are more stable. There must be a symbiotic relationship between these two patterns for optimal performance.

The *Joint by Joint* approach to human movement espoused by Gray Cook, PT, and Mike Boyle, CSCS, discusses the body's compensation mechanism up the kinetic chain when a joint loses its primary role of mobility. The chart shows a list of joints and their primary

Joint	Primary Movement
Ankle	Mobility
Knee	Stability
Hip	Mobility (multi-planar)
Lumbar Spine	Stability
Thoracic Spine	Mobility
Scapula	Stability
Gleno-humeral	Mobility

role in movement patterns.

The first thing you should notice is the joints alternate between mobility and stability. There is a basic alternating series of joint movements, where a loss of function in the joint below will affect the joint above. Compromised kinematic chain mobility secondary to one joint's relative immobility often results in compensatory movement patterns in order to recover lost function; this is referred to as a compensatory movement pattern.

So starting from the ground up, let's look at how joint movement dysfunction in the ankle and hip can cause compensatory pain-related symptoms. What's the primary loss with an injury or with lack of use? The body tries to splint and guard movement. It wants to "immobilize" as a protective mechanism for healing (and not simply where the site of pain is). Ankles lose mobility, knees lose stability and hips lose mobility. For example, the ankle loses mobility then the body takes it from the knee, which is supposed to be stable. The result is knee pain from overuse and lack of stability. The hip loses mobility and locks down, the body takes it from the lower back and pelvis. The result is lower-back and sacroiliac joint pain. If an athlete comes to you with a loss of hip mobility, the complaint will generally be one of lower-back pain. But it can also cause knee compensation pain. This is why you should always be evaluating the joints above and below the site of pain. The fix is usually increasing the mobility of a nearby joint.

Defining Stability

However, the hip can be both immobile and unstable. How can a joint be both immobile and unstable? Weakness of the hip in either flexion or extension causes compensation at the lumbar spine, while weakness in abduction (prevention of adduction) causes stress on the knee. Remember, a muscle has two

actions of joint movement, initiation and resistance.

For example, the gluteus medius initiates hip external rotation, but also prevents hip internal rotation. So in order to fully optimize muscle function, you must train that muscle in both movement actions. Poor psoas and iliacus strength or activation will cause lumbar flexion as a substitute for hip flexion. Poor strength or activation of the glutes will cause compensatory extension recruitment of the hamstrings and lumbar spine to replace the motion lost in hip extension.

As you can see, there are many variables in movement that must be assessed before an athlete is cleared for competition. Every athlete, regardless of the presenting injury and symptoms, should at a minimum have the ankles and hips evaluated. Below is a quick assessment list for both areas.

- Perform FABER and Thomas Test for the hips;
- Evaluate flexion, extension, internal rotation, external rotation, adduction and abduction (loaded and unloaded) to see mobility of the moving hip and stability of the weight-bearing hip;
- Trigger-point evaluation of the hip cuff;
- Ankle mobility test. In a half-kneeling position, have the client slowly lunge forward to see how far the knee can go over the toes before the heel leaves the ground. Target for adequate mobility in the sagittal plane is four inches over the toe. If “pinching” sensation results, evaluate for impingement at the talus;
- Assess joint mobility for possible manipulation of the ankle, hip and SI joint. I prefer Mulligan techniques for all mobility therapy, but use what is in your own arsenal.

Based on your assessment, perform the necessary mobility and stability techniques to restore proper function. Here is a list of my favorites.

Mobility

- Mulligan technique;
- Class 4 deep-tissue laser therapy to increase blood circulation and release myofascial restrictions. Dosage of 3,000 Joules per hip and 1,500 to each ankle;
- Trigger-point therapy to surrounding musculature;
- Dynamic movement drills;
- Active isolated rope stretching to ankle and hip joints (10 reps, two-second holds);

- Foam rolling and stick work to the myofascial chains.

Stability

- Class 4 deep-tissue laser therapy to increase blood circulation and release myofascial restrictions. Dosage of 3,000 Joules per hip and 1,500 to each ankle;
- Mini-band exercises of the hip in resisted internal rotation, lateral walks, supine bridges and squats. Optimizes firing patterns of the hip cuff;
- Single-leg dead lift patterns of hip stabilization;
- Rocker board and Air-X pads for proprioceptive facilitation;
- RNT-reactive neuromuscular techniques with resistance bands to the hip and knee for preventing femoral internal rotation and lateral body weight shifting;
- Taping techniques for stabilization.

Laser Effects

Class 4 deep-tissue laser therapy can be a vital part of the protocol. Whenever you have an injury, you have chemical damage to a cell. In order to maximize healing, deep-tissue laser therapy aims to photo-biostimulate (regenerate) chemically damaged cells. This therapy actually excites the kinetic energy within cells by transmitting healing energy known as photons. The skin absorbs these photons via a photo-chemical effect, not photo-thermal; therefore it does not cause heat damage to the tissues. Once photons reach the cells of the body, they promote a cascade of cellular activities. It can ignite the production of enzymes, stimulate mitochondria, increase vasodilation and lymphatic drainage, ATP synthesis, and elevate collagen formation substances to prevent the formation of scar tissue. This is a critical step in reducing long-term disabling chronic myofascial pain syndromes and joint mobility issues. It is recommended to use laser therapy prior to soft-tissue and manual therapy to increase tissue response and decrease muscle-memory rebounding.

According to Kyle Kiesel, PT, and Phil Plisky, PT, “there is a motor control adaptation that occurs following injury (partially pain driven) that many times does not normalize with rehabilitation efforts. The observation of whole movements may redirect and broaden the clinical focus by revealing limitations unrelated to the medical diagnosis but

pertinent to restoration of normal function.”

Look outside the proverbial box for other causes of dysfunction. The source of pain is rarely located at the site of pain. If you are going to release athletes back into competition, ensure they can withstand the mechanisms of force that will be applied to their sport-specific movement patterns.

A reliable way to screen adequate movement after therapy is via the Functional Movement Screen created by Gray Cook, PT, and Lee Burton, PhD. This screen involves putting a client through a seven-point screen to evaluate proper movement function. Specific movement tasks are designed to find the weak link or “energy leak” in body function that can potentially cause injury. Combined with a proper medical assessment and therapy, this is a fantastic combination to satisfy the movement criteria for resuming sports.

It is essential that health providers understand the relationship between body segments and how impairments in one body region may adversely affect function of another body region. By integrating the joint-by-joint approach and therapeutic outcomes you can formulate manual corrective strategies and exercise interventions to assist the athlete for long-term performance and durability. ■

Resources

1. Boyle, M. (2010). Advances in Functional Training. *On Target Publications*, 1, (5-10).
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3. Kiesel, K., Plisky, P., & Cook, G. (2010). *The Selective Functional Movement Assessment: An Integrated Model to Address Regional Interdependence*.

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