

## **A Guide to Handling Hamstring Injuries for the Coach**

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### **Introduction**

Hamstring injuries are probably the most troubling of all typical track and field injuries. The frequency with which they occur, their debilitating nature, combined with the fact that they seem to strike when least expected and at the worst times make them the most frightening of all injuries. In addition to this, hamstring injuries are also the most misunderstood injury in track and field. This often results in misapplied rehabilitation procedures. In this article we will attempt to establish a fundamental working knowledge of hamstring injuries. We will use some simplified anatomy and to explain the mechanisms that cause these injuries and voice some common sense injury management guidelines for the coach who must operate without great medical resources at hand.

### **Hamstring Injury - Symptoms of Other Problems**

Hamstrings are placed anatomically in a risky position, they readily receive stresses from above and below. In fact, practically all hamstring injuries result from dysfunction elsewhere in the body. The human hamstrings serve the same purpose as the "Check Engine" light on your car. The light indicates that there is a problem somewhere, but the reason the car won't run right is never the light. Hamstring problems indicate trouble somewhere, but almost never is the hamstring itself the root cause.

### **Weak Hamstrings???**

It is true that hamstrings might appear to be weak, even to a good therapist. However, runners use the hamstrings so much that the idea of a weak hamstring is preposterous and shouldn't even be considered in the diagnosis stage. The idea of doing extra hamstring exercises to strengthen the hamstrings sounds like a good idea to the unsophisticated, but any experienced track coach knows it never works or helps. Hamstrings might appear to be weak, but this results from altered neurology or because the hamstrings are placed in a disadvantaged position as a result of trouble elsewhere. In my career I have seen dozens of hamstrings test weak, then test strong only 3-4 minutes later after the work of a skilled therapist who knows how to restore proper neurology and relieve pressure on the region. If the hamstrings were truly weak in the first place, they wouldn't be strong few minutes later.

### **Finding the Cause**

For these reasons, dealing with a hamstring injury implies two tasks. Not only must the injury be dealt with, but the cause of the injury must be found. If you don't fix the cause then then rehabilitation will progress slowly at best. Often the injury will reoccur. Fortunately, the underlying causes of most hamstring injuries typically fall into a few categories.

### **Cause 1: Diminished Range of Motion in the Ankle**

Displacement of the talus often occurs in track and field, resulting in impingement and decreased range of motion in the ankle. Specifically, the ability of the ankle to dorsiflex is limited. This can be easily diagnosed by forcing the ankles into dorsiflexion and comparing the two... any discrepancy in the degree of dorsiflexion between the ankles indicates a problem (unless they both have the same problem!) In this syndrome the tibia-fibula complex becomes fixed at its lower end, and the body reacts by making it hypermobile in the upper end. This subjects the hamstring to unusual stresses. This is a frequent cause in most lower to middle hamstring injuries. The solution here is adjustment of the talus, so a chiropractor must be sought, preferably one who uses Gonstead techniques. Although I am not advocating you doing anything you are not licensed to do, this condition is so common that many elite level track coaches regularly perform this adjustment themselves on their athletes.

### **Cause 2: Anterior Tilt of the Pelvis**

If the pelvis is rotated forward into a position of anterior tilt, stresses are directly transmitted to the hamstrings. This problem commonly takes the appearance of a “butt-out posture”, with a more pronounced lumbar curve or swayback. Sometimes the problem is subtle and not easily observed. Athletes who show these types of postures when running and jumping are inherently inefficient, and the odds of hamstring injury increase dramatically in these cases. Anterior tilt of the pelvis can result from a number of subfactors.

**Lumbar Tightness.** Tightness in the lumbar spine places the hamstring in a compromised position because it alters the alignment of the pelvis, producing anterior rotation. Active release techniques and training adjustments are needed in this case. If this is the case, old-school low walks or duck walks are a very good rehabilitation tool because they provide a strengthening environment that rounds the lumbar spine. This problem is usually associated with some error in the training program. Improper or excessive squatting or plyometrics is a common cause. Too much overdistance running can produce tightness and is a likely cause as well.

**Hip Flexor Tightness.** Tightness in the hip flexors and rectus femoris results in decreased ranges of motion in the hip extension movement. The body inherently senses the need to overpush, the symmetry of the running cycle is destroyed, and the hamstring is apt to blow. This tightness often goes hand in hand with lumbar tightness, contributing to produce anterior pelvic tilt. Again, active release technique and training adjustments are needed in this case. The culprit is usually too much concentric hip flexor/quad work. Remember that track athletes use the hip flexors so much that they are already highly trained, extra hip flexor work often causes problems.

**Improperly Taught Techniques.** Anterior tilt of the pelvis is not always a result of overtraining, improper training design, or pathological causes. The ability to achieve a neutral, correct position of the pelvis while running is a skill that must be taught. Common technical culprits that produce these symptoms are incomplete pelvic angle progressions in the drive phase of sprint races or jump approaches, bending at the waist in hurdle takeoffs, and toe-first penultimate steps or plants in jumping activities.

**The “Grabbing” Hamstring.** Often we hear athletes complain about a grabbing sensation on the hamstring. The hamstring is basically pain free except at certain instances where the grabbing is felt. I typically handle these by sending the athlete to the doctor. In these situations only a few fibers may be torn, and the grabbing sensation is results from the surrounding fibers contracting to protect the injury site. In these cases it seems the body often doesn’t really recognize injury and an injection might be needed to spur the healing process.

**Prevention.** A big part of hamstring prevention is observation. Close observation of athletes during warmup and running activities should be an ongoing process. Decreases in range of motion, loss of symmetry in motion, or gait changes can all signal causes of hamstring injury and the need for action.

#### **Common Sense Rehabilitation Guidelines**

**Functional Pain Free Movement.** The theme of rehabilitation should be functional locomotive exercise that is pain free. This gentle exercise limits scar tissue formation.

**No Stretching at the Injury Site.** Static stretching seems to accelerate the inflammation process and causes a two week injury to last months. It’s a favorite activity of hamstring patients though because of the relief they feel afterwards. However, the relief felt from stretching results from the deadening effect on the proprioceptors, and is only temporary. Delay resumption of static stretching at the injury site as long as range of motion is improving. Tension caused the injury in the first place, so beware of indiscriminate applications of tension in rehabilitation.

**Stretch Surrounding Areas.** Stretching is applicable to surrounding muscles and muscle groups in order to prevent the placement of chronic tension on the injured muscle.

**Functional, Locomotive Rehab.** As soon as the patient can move about, rehabilitation must be functional and locomotive. Leg curls and similar exercises are a waste of time unless the injury is so bad the athlete can’t walk. RDLs, squats, and other such exercises may place excessive tension on the muscle, resulting in the same problems noted above.

## **The Rehabilitation Plan**

Here is a basic plan for hamstring rehabilitation. It's safe and effective and simple enough to help the coach who might not have access to medical resources. Each day, the athlete does 12x60 meters, progressing as possible over time through the exercises listed below, and progressing patiently enough to keep things pain free. On day one get the athlete walking, a day or two later jogging, etc.

- 1. Walking**
- 2. Easy Jogging**
- 3. Jogging**
- 4. Running**
- 5. Straight Leg Bounds**
- 6. Sprinting**

**Altered Training.** Any other components of the training program that can be executed pain-free can and should be continued as normal. Other activities can be modified slightly to keep the movement pain free. The hamstrings are involved to a greater degree in horizontal movement than vertical movement, so altering the plyometric program to feature vertical jumping exercises often enables plyometric training to continue nearly uninterrupted and is a good way to continue to involve high speed, explosive training in the program.