

Chronic Hamstring Injuries:

Dr. Ashley Swelin-Worobec, BSc, CSCS, D. Ac, DC

ACTIVE Sport and Health Centre
3300 Fairview Street
Burlington, Ontario
L7N 3N7
activesportandhealth.com

As multisport athletes, the demands placed on our bodies are different during each of triathlon's three disciplines. While swimming, biking, and running all require unique muscle function and motor coordination, all three have the common goal of creating one-dimensional forward motion! This lack of side to side movement places significant stresses on the muscles of our front and back, while demanding little from our lateral (outside) and medial (inside) muscles. As a result, muscular imbalances and repetitive strain injuries are common in our sport. In particular, this article will focus on hamstring injuries and what can be done to prevent a chronic, season-ending problem.

Most commonly, muscle strains are due to tensile demands that the muscular fibres cannot support. In triathlon, these demands are repetitive and cumulative in nature. Injury usually occurs at the muscle's weakest point; that is, where the muscle meets the tendon, or the musculotendinous junction. In fact, a 2005 study published in 'Clinical Biomechanics' determined that the musculotendinous junction of the hamstrings experiences the most stress as the leg moves from a bent to straight position, as seen at the bottom of the pedalstroke or just before the heel strikes the ground when running. Muscles that cross two joints are exceptionally prone to strain, such as the outermost of the three hamstring muscles, also known as the biceps femoris, which crosses both the hip and knee joints.

In order to strengthen this vulnerable area, research shows that eccentric training is more beneficial than concentric training. Eccentric training, by definition, is when a muscle is being lengthened while contracting, rather than a concentric approach, where a muscle is being shortened while contracting. For example, during a traditional hamstring curl, rather than focusing on forcefully bending the knee, exaggerate the motion of slowly lowering the weight, thereby stressing the hamstring muscle during a lengthening motion, and strengthening the musculotendinous junction.

When eccentric training, focus on slowly straightening the legs, to stress the hamstring muscle in a lengthened position, thus strengthening the injury-prone musculotendinous junction.

An interesting study in 'The International Journal of Sports Medicine' investigates the relationship between previous ankle sprains and same-sided hamstring strains. Many of us have come to the sport of triathlon through a varied sporting background, often involving ankle sprains that were not properly rehabilitated. The authors of this study found that the muscle activation of the gluteus maximus, the largest buttock muscle, was significantly delayed on those subjects with a history of ankle sprains. When applying these findings to the sport of triathlon, the importance of glute strengthening and proper activation patterns becomes apparent, to avoid placing the demands of hip extension on the weaker hamstring muscles. Localized injury in one part of the body influences muscle activity in another and may ultimately lead to pain.

The biggest risk factor to developing a hamstring injury is a history of prior hamstring injury! Therefore, proper rehabilitation is necessary to reduce the risk of developing a chronic problem. So what should you do if you've had a hamstring injury in the past? Well, further prevention is key!

1. **Make sure that you are properly fitted to your bike.** As the longest discipline in triathlon, proper cycling form is essential to prevent excessive muscular demands, increasing your risk of a repetitive injury. Generally, it is thought that the quadriceps to hamstring strength ratio should be 2:1, however, many people are quad-dominant and hamstring-deficient!
2. **Gait analysis.** A sports-based healthcare practitioner can implement a detailed running gait analysis, looking for biomechanical errors that may set you up for future injuries.
3. **Proper footwear.** Running can place forces of nearly three times your body weight through the joints of your lower limb with every stride! By determining your unique biomechanics, training demands, and racing goals, the proper running shoe will help to absorb these forces and provide you with an appropriate base of support.

What can you do if you're currently suffering with hamstring problems?

ACTIVE Sport and Health Centre
3300 Fairview Street
Burlington, Ontario
L7N 3N7

activesportandhealth.com

1. **Get the problem addressed early!** Generally, acute injuries heal faster before they are given the opportunity to become chronic. If something doesn't feel right, see a sports-based healthcare provider that can determine the problem and help to fix its cause. Treatment may involve soft tissue therapy, therapeutic modalities, and stretching.
2. **Rehabilitation.** Following a unique strengthening and stretching program, specific to your abilities and weaknesses, will provide you with the opportunity to heal fully and correct faulty biomechanics.
3. Follow the above advice regarding bike fitting, gait analysis, and proper running shoes, to help reduce your chance of suffering from another hamstring injury.

A hamstring injury does not have to end your triathlon season. With proper treatment and care, you can continue to swim, bike, and run! Happy training!