Hamstring & Running Injuries

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The hamstring muscles are the large group of muscles found on the posterior side of the thigh, extending from the bottom of the pelvis to the back of the shin bone. This set of tendons are essential towards the body’s functions to extend the hip joints and bend the knee joints. The hamstring is used during multiple sporting activities and everyday activities alike but, when you experience a pulled hamstring muscle, its symptoms can affect the body’s movements.

**Pulled Hamstring Symptoms**

Hamstring injuries can commonly happen if physical activities or sports are started without an appropriate warm-up, from overuse, or due to the muscles being stretched above the individuals range of motion. Occasionally, weak muscles may also lead to this problem. There are different types of hamstring injuries and depending on the severity, symptoms can be categorized into three different grades, each varying from each other.
Pulled Hamstring Muscle

In grade I, only a few muscle fibers are affected or the tear is considered microscopic where the muscle was stretched further from its limitation. The mild severity presents tightness and mild pain and discomfort, usually minimally limiting physical activity.

In grade II, the damage from the injury is moderate and moderate pain and discomfort follow soon after. During this grade, pain is experienced upon contact with the affected area and moderate swelling and bruising can be present. An athlete’s or an individual’s mobility during activities such as running and/or jumping can be moderately limited.

And last, a grade III hamstring injury indicates that the fibers or tendons of the muscle are significantly or completely torn, causing severe pain and discomfort while walking with considerable swelling, bruising, and in some cases, muscle spasms. Mobility can be greatly affected by a grade III hamstring injury and special measurements for treatment might be required.
As a running athlete, training is important for strengthening the muscles and building stamina, as well as improving overall fitness but, overworking the body can carry negative complications. An estimated nearly 80 percent of runners are injured each year, most of these injuries are caused by constant pressure on the muscles for an extended period of time. The 5 most frequent types of running injuries mainly involve the legs and feet.

**Hamstring Muscle Tear**

The hamstring muscles are a large group of muscles found on the back of the thigh. These function by stretching the hip joints and bending the knee joints. The hamstring is considerably used while running and a hamstring muscle tear can occur due to overuse, not warming up before any physical activity, or stretching the muscles beyond their range of motion. The severity of a hamstring injury ranges from a minor tear with mild pain, discomfort, and tightness, to a severe tear, where the muscle has been significantly or completely torn, causing severe pain, discomfort, and considerable swelling, bruising, and limited mobility.

Pulled Hamstring Muscle – Dralexiimenez.com
5 Common Runner Injuries

**ACL Injury**

An anterior cruciate ligament, or ACL, tear is recognized as one of the most common type of knee injuries, occurring during high demand sports where quick movements of the legs are most frequent. An ACL injury can result in numerous ways, although mostly in non-contact related injuries. Incorrectly landing from a jump or stopping abruptly from a run can cause the ligament to tear. Studies have shown that female athletes have a higher rate of experiencing an anterior cruciate ligament tear than men.

**Shin Splints**

Shin splints is a medical term used to characterize a variety of symptoms located along the tibia, or shin bone and the local muscles. Shin splints form when the muscle and bone tissue in the leg become overworked by constant and repetitive activity. Excessive high impact exercises, like those common while running, add stress to the tibia, developing shin splints and its familiar symptoms of pain.

**Quadratus Lumborum Muscle Pain**

Muscle strains, such as a quadratus lumborum muscle strain, may be a leading cause for the well-known symptoms of pain and discomfort while performing physical activity. The quadratus lumborum muscle is a large, triangular-shaped, muscle located deep on each side of the lower back. The thick muscular tissue allows movement of the lumbar spine and torso to move laterally from side to side as well as extend and stabilize the lower spine and posture. The symptoms of this type of injury range from mild to severe including different grades of restricted mobility and a burning sensation on the muscles.
Plantar Fasciitis

The plantar fascia is a thick cord of connective tissue, located along the bottom of the foot, that runs from the heel and connects to the base of the toes. The fascia functions as a cushion to support the arch of the foot. When tension begins to build up on the fascia from overexertion, small tears develop on the band of tissue resulting in irritation that causes inflammation and pain known as plantar fasciitis.

Rehabilitating Acute Hamstring Injuries

"Several sports and physical activities which involve a high demand of excessive stretching or sprinting, including kicking, sliding and split positions, have been determined to increase the risk of acute hamstring injuries among athletes. Acute hamstring injuries vary greatly from one another, each consisting of different injury types, location and size. Because of this, offering the proper recommendations regarding rehabilitation and prognosis about healing time and return-to-play can be challenging. Depending on the biomechanical cause, region and severity of the soft tissue injury, it’s been previously suggested that return-to-play timescales can differ between 28-51 days following acute hamstring injuries. However, this has been an ongoing issue within the field of many healthcare professionals."
When returning to the individual’s specific sport, the risk of re-injury is generally higher within the first 2 weeks. This occurs due to initial hamstring weakness, fatigue, lack of flexibility and strength imbalance between the eccentric hamstrings and the concentric quadriceps. The highest contributing factor though, is believed to be linked to an inadequate rehabilitation program, which may correspond with the premature return to physical activity. New evidence has shown the benefits of primarily utilizing eccentric strengthening exercises in hamstring rehabilitation performed with increased loads for longer musculotendinous lengths.

The semitendinosus, or ST, the semimembranosus, or SM, and the biceps femoris long and short heads (BFLH and BFSH) are part of the hamstring muscle group. They primarily function with the extension of the hip and flexion of the knee as well as providing multi-directional stability of the tibia and pelvis. These three muscles which make up the hamstring muscle group, cross the posterior aspect of both the hip and the knee joints, making them bi-articular. As a result, they are consistently responding to large mechanical forces created by upper limb, trunk and lower limb locomotion as a means of concentric and eccentric mobilization. During sporting activities, these forces will tend to increase, augmenting the frequency of injury.
In a study conducted at the University of Melbourne, biomechanical analysts measured the musculotendinous strain, velocity, force, power, work and other biomechanical loads experienced by the hamstrings throughout the course of over-ground sprinting and compared the biomechanical load across each individual hamstring muscle.

Basically, the hamstrings are subjected to a stretch-shortening cycle when sprinting, with the lengthening phase occurring during the terminal swing and the shortening phase commencing just before each foot strike, continuing throughout the stance. Then, the biomechanical load on the bi-articular hamstring muscles were determined to be stronger during the terminal swing.

BFLH had the greatest musculotendinous strain, ST displayed considerable musculotendinous lengthening velocity, and SM produced the highest musculotendinous force and both absorbed and generated the most musculotendinous power. Similar research also distinguished peak musculotendinous strain as a large contributor to eccentric muscle damage or injury, most commonly acute hamstring injuries, instead of peak muscle strength. This is why eccentric strengthening is often a rehabilitation recommendation for acute hamstring injuries.

**Location and Severity of Injury**
Rehabilitating Acute Hamstring Injuries

In a randomized and controlled study on professional Swedish football players, 69 percent of injuries were primarily located in BFLH. In contrast, 21 percent of the players experienced their primary injury within SM. While the most common, approximately 80 percent, suffered a secondary injury to ST as well as BFLH or SM, a clear 94 percent of the primary injuries were found to be of the sprinting-type and were located in the BFLH, whereas, SM was the most common location for the stretching- type of injury, accounting for approximately 76 percent. These findings were supported in another similar article.
Classifying a soft tissue injury, including acute hamstring injuries, depends largely on a grading system ranging from: I, mild; II, moderate; and III, severe. The different classifications offer useful descriptions for each type of soft tissue injuries between healthcare professionals during clinical diagnosis and prognosis following an acute injury. A mild grading describes an injury where a small quantity of muscle fibres are involved with minor swelling, discomfort, minimal or no loss of strength or restriction of movement. A moderate grading describes an injury with a significant tear of several muscle fibres, pain and swelling, reduced power and limited mobility. A severe grading describes an injury where a tear has occurred across an entire cross section of muscle, commonly a tendinous avulsion, and a surgical opinion may be required. It has also been utilized as a classification system for radiological methods, such as magnetic resonance imaging, or MRI, or ultrasound, if required for complementary confirmation of diagnosis.

The British Athletics Medical Team proposed a new injury classification system for improved diagnostic accuracy and prognostication based on MRI features.

Determining accurate return-to-play timescales following many acute hamstring injuries has been proven to be difficult. For example, injuries involving an intramuscular tendon or aponeurosis with adjacent muscle fibres generally need shorter recovery periods than those involving a proximal free tendon and/or MTJ.

There’s also been connections between MRI findings according to the region of the injury and return-to-play. Particularly, it has been hypothesized that the shorter the distance between the proximal pole of the injury and the ischial tuberosity found on MRI evaluations similarly determined by the presence of oedema, the longer the time to return will be. In the same manner, the length of oedema shows a similar effect on recovery time. The longer the length, the longer the recovery. Additionally, the position of peak pain simultaneously following acute hamstring injuries are also associated with increased recovery periods.
Furthermore, there have been attempts to clarify the connection between the grading of acute hamstring injuries and return-to-play. In a prospective cohort study on 207 professional football players with acute hamstring injuries, 57 percent were identified as grade I, 27 percent were identified as grade II, and only 3 percent were identified as grade III. The athletes with grade I injuries returned to play within an average of 17 days. The athletes with grade II injuries returned within 22 days and those with grade III injuries returned approximately within 73 days. According to the study, 84 percent of these injuries affected the BF, 11 percent the SM, and 5 percent the ST. However, there was no significant difference in lay-off time for injuries to the three different muscles. This has been compared to 5-23 days with grade I-II injuries, and 28-51 days for grade I-III in other studies respectively.

Rehabilitation for Acute Hamstring Injuries

Various researchers have previously argued the benefits of eccentric strengthening following acute hamstring injuries against concentric strengthening when focusing to reduce timeframes for return-to-play. The bottom line of this argument is that with the majority of acute hamstring injuries occurring during eccentric loading, the rehabilitation should be similar to the specific circumstance which caused the injury in the first place. One study showed a significant difference between an eccentric and concentric rehabilitation program following acute hamstring injuries in elite and non-elite football players.

The randomized and controlled clinical trial conducted on 75 football players in Sweden, demonstrated that using eccentric strengthening programs rather than concentric strengthening programs, reduced the time to return-to-play by 23 days, regardless of the type of injury or the site of injury. The result showed the number of days to return to full– team training and availability for match selection.
Furthermore, two rehabilitation protocols were utilized five days following the injury. All players had sustained a sprinting-type injury as a result of high speed running or a stretching-type injury as a result of high kicking, split positions and glide tackling. Certain criteria were excluded for the study, including previous acute hamstring injuries, trauma to the posterior thigh, ongoing history of low back complications and pregnancy.

All players were subjected to an MRI analysis 5 days following the injury, in order to expose the severity and area of injury. A player was considered to be fit enough to return to full-team training using a test known as the active Askling H-test. A positive test is when a player experiences any insecurity or apprehension when performing the test. The test should be completed without full dorsiflexion of the ankle.
Approximately 72 percent of players sustained sprinting-type injuries, while 28 percent experienced stretching-type injuries. Of these, 69 percent suffered injury to the BFLH, whereas 21 percent were located in the SM. Injuries to ST were only sustained as secondary injuries, approximately 48 percent with the BFLH and 44 percent with the SM. In addition, 94 percent of the sprinting-type injuries were located in the BFLH while the SM was the most common location for the stretching-type injury, accounting for about 76 percent of the injuries.

The two rehabilitation protocols used were labelled the L-protocol and the C-protocol. The L-protocol focused on loading the hamstrings during lengthening and the C-protocol consisted of exercises with no emphasis on lengthening. Each protocol utilized three exercises which could be performed anywhere and were not dependent of advanced equipment. They also aimed at targeting flexibility, mobilization, trunk, and pelvic and/or muscle stability as well as specific strength training to the hamstrings. All were performed in the sagittal plane with speed and load progression.

**Conclusion of Study**

The time to return was determined to be significantly shorter in the L-protocol as compared to the C-protocol, averaging 28 days and 51 days appropriately. Time to return was also significantly shorter in the L-protocol than in the C-protocol for acute hamstring injuries of both sprinting-type and stretching-type as well as for injuries of different injury classification. However, there still remains question over whether the C-protocol is specific enough for hamstring activation to create a legitimate comparison.

**C-Protocol**

Standing Contract/Relax Hamstring Stretch (2x a day, 3 sets x 4 reps)
Standing Cable/Resistance Band Hip Extension (1x a day, 3 sets x 6 reps)
Rehabilitating Acute Hamstring Injuries

Supine Single-leg Pelvic Lift (Once every 3rd day, 3 sets x 8 reps)

L-Protocol
The Extender (2x a day, 3 sets x 12 reps)
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The Diver (Once every other day, 3 sets x 6 reps)

The Glider (Once every 3rd day, 3 sets x 4 reps)
Rehabilitating Acute Hamstring Injuries

Chiropractic Care for Acute Hamstring Injuries
Aside from the above mentioned rehabilitation protocols, many athletes who’ve suffered acute hamstring injuries, as well as other types of injuries, have found relief from their symptoms with a soft tissue specialist, or a chiropractor. Chiropractic care focuses on numerous musculoskeletal injuries including a variety of injuries and conditions associated with the nervous system. A chiropractor will use several rehabilitation techniques, most commonly spinal adjustments and manual manipulations, to carefully restore the individual’s natural mobility, flexibility and strength after experiencing an injury, helping to decrease their symptoms of pain and discomfort. Additionally, a soft tissue specialist will generally recommend a series of appropriate exercises and stretches to speed up the rehabilitation process. Chiropractic treatment not only treats existing injuries, it can also be used to prevent a variety of sports injuries, including acute hamstring injuries.

Fortunately for athletes, after experiencing an injury or even if there’s no current injury, there are several effective methods which could be used to help alleviate the symptoms as well as ensure the athlete returns to their specific sport of physical activity as soon as possible without the risk of re-injury.

By Dr. Alex Jimenez

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Rehabilitating Acute Hamstring Injuries

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My name is Dr.Alex Jimenez D.C.,C.C.S.T, a clinical pain doctor who uses cutting-edge therapies and functional rehabilitation procedures focused on total health, strength training and complete conditioning. We specialize in restoring normal body functions after neck, back, spinal and soft tissue injuries. We take a global physiological treatment approach in order to regain total functional health.

We also use Advanced Chiropractic Techniques, Specialized Diet Plans, Agility Training, Cross-Fit and the PUSH-Rx Rehabilitation System to treat patients suffering from various injuries and health problems.

We have been blessed to perfect our methods with thousand of El Pasoans over the last 26 years. This has allowed us to create fitness and better functional bodies through the researched methods and total programs offered. These programs are natural, and use the body’s own ability to achieve goals of improvement, rather than introducing harmful chemicals, controversial hormone replacement, surgery, or addictive drugs. We want you to live a life that is fulfilled with more energy, positive attitude, better sleep, less pain, proper body weight and educated on how to maintain this way of life.

As an extension to dynamic rehabilitation, we also offer our patients and athletes a diverse portfolio of strength equipment, high performance exercises and advanced agility options. We are very proud to have teamed up with the cities premier therapist and trainers in order to provide high level competitive athletes the option to push themselves to their highest abilities within our facility.
Remember, you are in control of your life. Take control, learn how improve your health for yourself and your loved ones.

With a bit of work, we can achieve optimal health together.

It’s all about: LIVING, LOVING & MATTERING!

God Bless

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