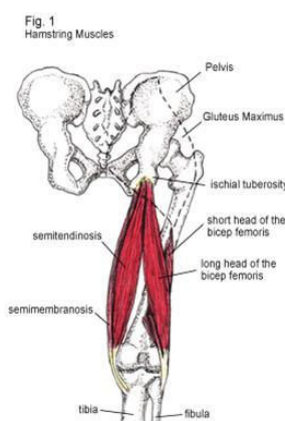




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## The Hamstring Strain - The Most Common Lower Limb Muscle Strain



A muscle strain is a stretch or tear of muscle fibres. In the leg, muscle strains happen when a muscle is either stretched beyond its limits or forced into extreme contraction.

The hamstring muscle group is made up of the Semitendinosus, Semimembranosus and Biceps femoris muscles, which are large, powerful muscles that span the back of the thigh, from the lower pelvis to the back of the shin bone. The hamstring is the important muscle that functions to extend the hip and bend the knee.

Mild to severe hamstrings injuries are very common in all sports involving sudden acceleration, especially track and field, soccer, basket ball and hockey. The hamstrings play a vital role in walking, running, jumping, and controlling movements of the trunk.

### Classification of a Strain

Hamstring strains can occur at one of the attachment sites or at any point along the length of the muscle. They are classified as either grade one, two or three depending on the severity.

#### Grade one- mild:

Excessive stretching or minor tearing of a few muscle fibres. The pain can often be localized with one finger. Some stiffness and weakness will be present. If exercise is attempted, the pain and stiffness may decrease during the activity, but return after, often with much greater intensity.

#### Grade two - moderate:

Moderate tearing of the muscle fibres with pain generally covering a larger area compared to the grade one strain. Stiffness and weakness will be felt and the painful area may appear black and blue due to bleeding within the injured muscle. Significant limping may also occur when walking. Spasm and weakness in the hamstrings muscle will occur and pain will be felt on contraction.

#### Grade three - severe:

A complete rupture of the muscle. Pain is often diminished due to tearing of the muscle and nerve. Wide-spread bruising and swelling will be present with a gap often being palpable in the hamstrings muscle. Severe spasm is present in the remaining muscle. 3rd degree strains are a rare occurrence.

### Symptoms of a Pulled Hamstring

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- A sudden sharp onset of pain at the back of the leg during exercise-usually during sprinting or high velocity movements (often near the beginning or near the end of the sport activity).
  - Usually the athlete cannot continue playing.
  - May have pain with sitting or while walking uphill or ascending stairs.
  - Swelling may accompany more severe injuries.
  - Pain on contracting the muscle against resistance. Bending the knee is often painful after a strained hamstring, and can even prevent the patient from walking normally.
  - Pain on stretching the muscle (straightening the knee whilst bending forwards).
  - Bruising: Small tears within the muscle cause bleeding and subsequent bruising. The bruise begins in the back of the thigh, and as time passes the bruise will pass down below the knee.

### What causes Hamstring Injury?

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- ***Greater Quadriceps(Thigh muscles) versus Hamstrings strength:*** The most common cause of hamstring injuries originates from an imbalance between the quadriceps muscles (located at the front of the upper leg) and the hamstring muscles. The quadriceps are a very large, strong group of muscles that can become so strong that they overpower the hamstrings, putting a lot of tension on the hamstring muscles.
- ***Hamstring strength:*** Studies have shown that lack of hamstring strength is strongly linked to hamstring injury.
- ***Previous Injury:*** Prior injuries to the hamstrings or adductor muscles can greatly increase the chance of future injury.
- ***Flexibility:*** Research suggests that the greater the flexibility of the hamstrings the less prone they are to injury.
- ***Ankle inflexibility:*** reduced range of ankle movement may overload the hamstrings.
- ***Weakness or instability in lower back and core muscle:*** Less than ideal strength and mobility in core muscles may predispose athletes to hamstrings strains.
- ***Quadriceps tightness.***
- ***Rapid growth:*** seen during adolescence can cause a natural predisposition to hamstring injuries for this age group.
- Less than ideal ***running mechanics***
- ***Inadequate warm up:*** A proper warm-up is protective because it increases range of motion and reduces stiffness
- ***Fatigued hamstrings:*** Fatigue reduces the energy-absorbing capabilities of muscle, making them more susceptible to injury.
- ***Age:*** The older the individual the greater at risk to a pulled hamstring.
- ***Lumbosacral nerve impingement:*** Nerve impingement in L5-S1 can lead to associated hamstring muscle weakness.

### How to Prevent a Hamstring Strain

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There is no foolproof way to completely avoid hamstring injuries. However, the risks can be minimized by paying attention to the principles of muscle strength and flexibility. Flexibility should be maximized by a regular stretching program as well as a period of warm-up and stretching before the intended activity.

#### Hamstring to quadricep strength ratio

The hamstrings should fall between 60-70% of the quad strength. To insure sufficient hamstring strength, it is recommended that athletes perform a series of exercises that

isolate the hamstrings and are specific to their sport.

#### Flexibility and warm up

Another contributing factor to hamstring injury is a lack of flexibility. This can easily be prevented with a good stretching program. One of the most important methods of preventing hamstring strains is to warm up correctly- a muscle stretches best (and most safely) when it is warmed up. Try a low intensity exercise for 10 minutes just before stretching to get the most effective results. Preferably use dynamic stretches in your warm-up which incorporate similar movement patterns associated with your particular sport. Stretches should be comfortable and never painful. Don't forget to also stretch again after the game, as part of your cool down which should be more passive in nature.

#### Core strength

Strength and stability of the pelvic complex is an important aspect of hamstrings injury rehabilitation. Instability of the pelvis during sprinting can increase hamstrings load and thus predispose the athlete to injury.

#### Strengthen muscles that assist the Hamstrings

If gluteal and adductor magnus muscle strength is insufficient the hamstrings may be overloaded.

#### Hydration

Appropriate fluid intake is essential to avoid electrolyte imbalance and dehydration. Dehydration can lead to muscle cramping, thereby increasing the chance of muscle injury

## How to Manage Hamstrings Strain

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The most important phase for treatment is the first 48 hours post-injury. In this time the following can be carried out by the injured themselves.

#### RICE

- **Rest**- because of bleeding and swelling, athletes should stop their activity and rest immediately to prevent further injury and allow time to heal.
- **Ice**- to control swelling and minimise bleeding
- **Compress**- use a compression bandage to minimize swelling and bleeding in the tissue.
- **Elevate**- to reduce swelling

This treatment needs to continue for at least 48 to 72 hours. This is the most critical time for the injured area; correct treatment now can mean the difference between an annoying injury and a permanent, re-occurring, debilitating injury.

During this phase, do not run or exercise, do not stretch the injured area, do not consume alcohol, do not apply heat and do not massage the area.

#### Physiotherapy

It is advised that you seek physiotherapy treatment for a hamstrings strain ASAP, because if scar tissue forms then this will form a point of weakness in the muscle which can create a recurring hamstring injury, which may become chronic.

Types of physiotherapy treatment may include:

- Modalities such as electrical stimulation, ice, or ultrasound to help reduce pain and swelling
- Compression bandaging or neoprene support may be indicated in Grade 2&3 strains

to support the damaged tissue

- Assessment of lumbar spine to eliminate nerve entrapment as the main cause.
- Thorough biomechanical assessment and gait analysis
- Spinal, pelvis and hip joint mobilisation
- Deep tissue friction massage to reduce the formation of scar tissue.
- Rehabilitation exercises to restore flexibility and strength
- Acupuncture to promote bloodflow and healing.
- Possible orthotics prescription to control poor foot mechanics.
- A supportive brace may be necessary.
- Advice on graded return to sport

### Non-steroidal anti-inflammatory drug

In addition, you can take a non-steroidal anti-inflammatory drug (NSAID), to ease the pain and relieve swelling. This should be done under the supervision of your GP or physiotherapist.

### Stretching

Studies have shown that the use of dynamic stretches (slow controlled movements through the full range of motion) is the most appropriate exercises for warming up. By contrast, static stretches are more appropriate for the cool down and to improve range.


For more information about Dynamic and Passive Stretching, [click here](#).

For more information about PHYSIO4ALL's services, have a look at our [Physiotherapy and Clinical Pilates Brochure](#), and our [Exercise Classes Brochure](#).

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