

# Hamstring Strains

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Hamstring injuries are a common injury in sports especially if participating in activities that require sprinting, such as track, basketball and football. Usually referred to simply as the hamstring, it is the group of three muscles and bordering tendons at the back of the thigh and knee: the semitendinosus, semimembranosus, and biceps femoris. Its function is to bend the knee and move the thigh backwards from the hip. Injury occurs when this group is forcibly stretched beyond its limits and the muscle tissue tears. There are three degrees of strains, depending upon the severity of the injury.

## Grade 1

- First-degree hamstring strains are simply a few damaged muscle fibres, within the muscle group. There may be some swelling or discomfort, but usually this will not effect the ability to walk normally.

## Grade 2

- Second-degree strains involve damage to a number of extensive muscle fibres, usually requiring the attention of a dedicated sports-medicine physician. There may be pain, noticeable swelling, or a limp. It would be difficult to fully straighten the knee and trying to flex the knee again resistance causes pain.

## Grade 3

- Third-degree strains involve a complete rupture of muscle fibres. There would certainly be severe pain and very immediate and noticeable swelling. It would be difficult to weight bear with out the help of crutches as well. Luckily, this is rare but is often serious enough to require surgery.

The hamstrings work in a very specific way during sprinting. Whilst in mid stride, the hamstring lengthens, usually while under load from the body weight and shifting forces of the motion impact. It works to pull back the tibia, or the shin, after it kicks forward when the leg is stretched out to full stride. In addition, the hamstring is responsible for eccentric deceleration and sudden changing of directions, both of which incur a lot of stress.

A strain can occur in these circumstances when the weight and forces carried in the body and muscles, is changed in orientation or by sudden changes in direction. This is when the muscle is challenged whilst already under a full load, or is working beyond its capacity and overstriding occurs. The damage often occurs when the muscle is fully stretched out, just before it contracts to bend the knee.

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When the injury happens it will often be sudden, with the athlete immediately feeling the pain of the trauma. In the case of second-degree and third-degree muscle strains, swelling and tightening of the local area surrounding the site of the injury will follow. With first-degree injuries swelling will usually occur within the first few hours with only the sign of minor bruising to the limb, with increased swelling to come later. The athlete will also notice an immediate loss of strength in the limb, with weakness persisting for several weeks, depending on the severity of the injury. This can continue for longer, especially if the hamstring strain is a third-degree where the muscle tissue has been completely torn and compromised.

### Treatment and Rehabilitation

Most of the time, specifically if the hamstring strain is first-degree, the body will respond well to R.I.C.E: Rest, Ice, Compression and Elevation. With these minor injuries the healing process is quick and doesn't require any specific program to aid with the rehabilitation back into sport. Although, players who do suffer from first-degree muscle strain should be advised to examine the reasons why they have become injured in this manner to prevent further injury.

Regardless of the severity of the hamstring injury, the treatment is always the same. The limb should be rested in an elevated position with a padded ice pack for at least 20 minutes every 2 hours. This may not be practical in every application, but it is an important part of the healing process which, if ignored, will extend the healing time. A compression bandage or thigh support can help with the immediate local pain of, if available. This can also reduce the swelling and, when used with ice packs, is highly effective at minimizing pain and helping the athlete regain their normal mobility.

The patient must also be encouraged to rest. While this may be difficult for the competitive athlete, if not rested the injury can become much worse. A first-degree injury, if left unattended or allowed to be used in sports, can quickly become a second-degree strain. Similarly a second-degree can quickly become a third-degree injury.

When examining a patient who has suffered from any muscle strain it is crucial to establish a clear diagnosis of the type of injury suffered. Reviewing past medical notes is important to get an indication of past injuries, specifically previous back and thigh



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problems, as well as any possibly related underlying medical conditions. MRI scans should be requested, this can confirm the amount of damage to the muscle and if there is an avulsion of the tendon, (where the injured tendon has pulled away small pieces of bone).

Rehabilitation should include resistance exercises and stretching as they gently help to align the scar tissue that forms during the healing process. This alignment of the scar tissue along the stress lines of the muscle allows the strength of the hamstring to be retained. If aligned against the muscle fibres, it will become weakened and the possibility of re-injury is increased. The resistance training has the added advantage of allowing the player to remain at a competitive level of fitness. As the rehabilitation continues and the patient continues to make progress, the repetitions of the stretches are increased and core-strengthening exercises are introduced.

The severity of the injury will dictate the length of recovery and rehabilitation time. Someone with a first-degree injury may be able to return to a lower level of activity such as jogging within 7 to 9 days and sprinting within 3 weeks. With a third-degree injury the return to this reduced level can take upwards of 3 months. It is important when return to sport to ensure the athlete is able to compete effectively and without a risk of repeated injury. It is important that a Physician who specializes in Sports Medicine review the rehabilitation process to confirm the appropriate measures are taken. If this recovery process is not adhered to, the return to sport can be delayed or the athlete may be unable to compete on the same level as before.



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