

## Physical Therapist's Guide to Hamstring Injuries

A hamstring injury occurs when 1 or more of the 3 hamstring muscles or tendons (a type of soft tissue connecting the muscle to the bone) tear. It is 1 of the most common injuries of the lower body, particularly affecting athletes participating in sports such as football, soccer, or track. After tearing a hamstring muscle, a person is 2 to 6 times more likely to suffer a subsequent injury. Surgery is required to treat the most severe cases. However, in most cases, hamstring injuries are managed with physical therapy.

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### What are Hamstring Injuries?

The hamstrings make up the primary muscle group responsible for straightening (extending) the hip and bending (flexing) the knee. It includes a group of 3 muscles along the back of the thigh that connect the pelvis to the leg. The three muscles are the:

- Semitendinosus
- Semimembranosus
- Biceps femoris



### Hamstring Injuries:

Hamstring injuries occur when excessive force is placed across the muscles. This typically happens during sudden starts or stops when running, a rapid change of direction with "cutting" or jumping maneuvers, or when the muscle is overstretched by activities such as sprinting, hurdling, kicking, or heavy lifting.

The common structures involved in hamstring injuries are:

- Hamstring muscle(s) and/or tendon (a type of soft tissue that connects muscle to bone)
- Bursa (a fluid-filled sack that sits between bones and soft tissues to limit friction), usually irritated with recurring hamstring injuries
- Ischial tuberosity (the "sit-bone"), which in rare cases can be fractured by traumatic injury

Risk factors for hamstring injuries include:

- A history of prior hamstring injury
- Muscle imbalances (particularly hamstring weakness)
- Poor flexibility (muscle tightness)
- Inadequate warm-up before activity
- Muscle fatigue

## How Does it Feel?

When a person injures a hamstring muscle, the symptoms are related to the severity of the injury. Mild hamstring strains often just feel like a pulled or cramping muscle; you might not even realize you have pulled your hamstring until you stop performing the activity, or until the next day, when you might have soreness, tightness, or bruising. However, more involved injuries can be painful, and your symptoms might include:

- A sudden, sharp pain in the buttocks or back of the thigh
- A feeling of a "pop" or tearing in the muscle
- Bruising within hours or days after the injury
- Swelling
- Tenderness to touch
- Difficulty sitting comfortably, lifting the leg when lying down, or straightening the knee
- Difficulty walking, resulting in a limp

## How Is It Diagnosed?

Diagnosis of hamstring injuries starts with a thorough understanding of your health history and the cause of the injury. The questions your therapist may ask include:

- If you have had a similar injury before
- What you were doing when you first felt the pain
- Where you felt the pain, and if you felt a "pop"
- If you noticed any swelling or bruising in the first 24 hours after the injury
- What you were able to do immediately following the injury, and how you have been functioning since the injury (walking, sleeping, lifting your leg, etc.)

Your physical therapist will also perform a clinical evaluation, including some of the following observations and tests to determine the nature of your injury:

- **Observation:** To note any discoloration or bruising
- **Pain:** To identify your current pain level, and the activities that make your pain better or worse
- **Palpation:** To pinpoint the location and size of the tender area through touch, which will help determine the severity of the injury
- **Range of motion:** To compare the motion of your injured leg with your healthy leg

- **Muscle strength:** To determine the strength of the hamstring muscles when bending or straightening your knee and hip
- **Gait analysis:** To note any limping or pain when walking

Typically, hamstring injuries are classified as **Grade I – III** depending on the severity of the injury.

- **Grade I:** Mild strain with minimal tearing; usually feels like a pulled or cramping muscle
- **Grade II:** Moderate strain with partial tearing; may cause a stinging or burning sensation at the back of the thigh
- **Grade III:** A severe, complete muscle tear; may result in a “lump” on the back of the thigh where the muscle has torn

If your physical therapist suspects a severe injury, you will likely be referred to an orthopedic physician for medical diagnostic imaging, including x-ray and MRI, to evaluate the extent of the injury. In the event of a fracture of the ischial tuberosity (sit-bone) and/or a complete rupture of the muscle, surgery might be recommended.

## How Can a Physical Therapist Help?

Your physical therapist will design an individualized treatment program specific to the exact nature of your injury and your goals.

### The First 24-48 hours

Physical therapy may include:

- Resting the injured area by avoiding aggravating activities, such as walking or working out. If you are having notable difficulty walking, crutches may be recommended.
- Applying ice to the injured area 3-4x/day for 15-20 minutes (with a towel placed between your skin and the ice).
- Applying a compression wrap to the area to aid in decreasing swelling and pain.
- Referral to another health care provider for further diagnostic testing (if needed).

### Range of motion

It is common for muscles and joints to become stiff after an injury. As your pain decreases, your physical therapist will begin gentle flexibility exercises, such as stretching your hamstring muscles.

### Muscle strength

Hamstring strengthening will be an essential part of your rehabilitation program. Your physical therapist will compare the strength of the muscle groups in each leg, and prescribe specific exercises to target areas of weakness.

### Manual therapy

Many physical therapists are trained in hands-on "manual" therapy to move and manipulate muscles and joints to improve motion, flexibility, and strength. These techniques can target areas that are difficult to treat on your own.

## Functional training

As you regain the flexibility and strength in your hamstrings, it will be important to teach your body how to move so you no longer put excessive stress on the previously injured area. Your physical therapist will develop a functional training program specific to your desired activity.

In the event that the severity of your hamstring injury requires surgical treatment, a physical therapist will guide your postoperative rehabilitation. Your physical therapist will communicate with your surgeon to ensure complete and consistent postoperative care.

## Can this Injury or Condition be Prevented?

You can decrease your risk of a hamstring injury in the following ways:

- Always warm up before participating in athletic activities.
- Avoid starting a new activity too quickly; gradually increase the frequency and intensity of the activity so that your body may adapt to the new movement patterns.
- Listen to your body after you work out (and stretch, apply ice, rest as needed) prior to engaging in the same routine again.
- Use proper lifting and squatting techniques, particularly when maneuvering heavy objects.

## Real Life Experiences

John is a 28-year-old former collegiate football player. Since graduating from college, his workout routine typically involves several days of weightlifting and the occasional pick-up basketball game. John is an engineer working 40 hours a week, primarily seated at his desk. Recently, work has been very busy, as his company has been assigned a new project. John hasn't made it to the gym in several weeks.

One Friday afternoon as he is leaving the office, John runs into a colleague on his way to the gym for a game of pick-up basketball. John decides to join him. When he gets to the gym, the game has already started, so he has to rush and doesn't have time to warm up.

During the first game, John runs down the court on a fast break but doesn't see a defender step into his path until the last second. To avoid colliding, he stops suddenly. When his foot hits the ground, he feels a sudden, sharp pain in the back of his thigh, like a very bad cramp, and he has to limp off the court. Even after 20 minutes of resting and trying to stretch, John is unable to walk normally without pain.

When John wakes up the next morning, he is very sore, still unable to walk properly, and sees a bruise forming on the back of his thigh. He contacts his local physical therapist.

During his initial evaluation, John's physical therapist assesses his signs and symptoms and indicates that he has suffered a grade II hamstring strain. That day, John is given a compression wrap for his thigh, is instructed in gentle stretching exercises, and educated on applying ice to the injury and on modifying his activity level. He discusses his goals with his physical therapist, indicating that, following his recovery, he would like to be more consistent with his workout routine and participate in a recreational basketball league.

Over the next 4 weeks, John attends physical therapy 2 times a week. As his pain improves, he is guided through a progressive exercise program to strengthen his hamstrings and improve his body control when running, jumping, and "cutting." His therapist also uses manual therapy techniques to improve the mobility and

flexibility of his hamstring muscle. When he is reevaluated, his therapist is happy with his progress and offers recommendations for a gradual rebuilding of his workout routine.

A month later, John calls his physical therapist and states that he is feeling great! He is going to the gym 3 times each week, using the therapist's recommendations for exercise as his guide. John says he has started shooting baskets without any trouble, and he's planning to sign up for the basketball league.

## **What Kind of Physical Therapist Do I Need?**

All physical therapists are prepared through education and experience to treat hamstring injuries. However, you may want to consider:

- A physical therapist who is experienced in treating people with hamstring injuries. Some physical therapists have a practice with an orthopedic or sports rehabilitation focus.
- A physical therapist who is a board-certified clinical specialist or who completed a residency or fellowship in orthopedics or sports physical therapy. This therapist has advanced knowledge, experience, and skills that may apply to your condition.

You can find physical therapists that have these and other credentials by using [Find a PT](#), the online tool built by the American Physical Therapy Association [[www.APTA.org](http://www.APTA.org)] to help you search for physical therapists with specific clinical expertise in your geographic area.

General tips when you're looking for a physical therapist (or any other health care provider):

- Get recommendations from family and friends or from other health care providers.
- When you contact a physical therapy clinic for an appointment, ask about the physical therapists' experience in helping people with hamstring injuries.
- During your first visit with the physical therapist, be prepared to describe your symptoms in as much detail as possible, and report activities what makes your symptoms worse.

## Further Reading

The American Physical Therapy Association (APTA) believes that consumers should have access to information that could help them make health care decisions and also prepare them for their visit with their health care provider.

The following articles provide some of the best scientific evidence related to physical therapy treatment of hamstring injuries. The articles report recent research and give an overview of the standards of practice both in the United States and internationally. The article titles are linked either to a PubMed\* abstract of the article or to free full text, so that you can read it or print out a copy to bring with you to your health care provider.

Opar DA, Williams MD, Shield AJ. Hamstring strain injuries: factors that lead to injury and re-injury. Sports Med. 2012;42:209-226. [Article Summary on PubMed.](#)

Ropiak CR, Bosco JA. Hamstring injuries. Bull NYU Hosp Jt Dis. 2012;70:41-48. [Free Article.](#)

Witvrouw E, Danneels L, Asselman P, et al. Muscle flexibility as a risk factor for developing muscle injuries in male professional soccer players: a prospective study. Am J Sports Med. 2003;31:41-46. [Article Summary on PubMed.](#)

Drezner JA. Practical management: hamstring muscle injuries. Clin J Sport Med. 2003;13:48-52. [Article Summary on PubMed.](#)

\* PubMed is a free online resource developed by the National Center for Biotechnology Information (NCBI). PubMed contains millions of citations to biomedical literature, including citations in the National Library of Medicine's MEDLINE database.

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