

Risks For and Best Management of Hamstring Strains

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Physical Therapy in Chino for Hamstring

Welcome to Central Care Physical Therapy's patient resource about hamstring injuries.

Hamstring injuries are fairly common in athletes or others participating in recreational sports. The injury can be fairly debilitating for a competitive athlete, requiring at least two weeks (and as much as six weeks) rest for recovery. And even with proper care, the recurrence rate for reinjury is fairly high.

In fact, there's evidence that at least one-third of injured professional or amateur athletes older than 18 will reinjure themselves within the same season. The rate is much higher (60 to 70 per cent) for recurrence in future seasons. If that's the case, then it seems that current treatment for this injury may not be effective.

Management of hamstring injuries usually centers around treating the acute injury and taking a look at risk factors. If any of those risk factors for injury can be modified, management should be directed to do so. This might be stretching and flexibility exercises for tight hamstrings or muscle retraining for muscle imbalances or muscle weakness.

In order to review how we approach hamstring injuries, it's helpful to know what studies have been published on this topic and what they had to say. Toward that end, this group of Physical Therapists reviewed all of the literature published over the last 25 years on the topic of hamstring strains, injuries, pulls, or tears.

Their goal was to look for best evidence recommendations for prevention and treatment of this condition. Prevention centered on identifying and changing risk factors for injury. Treatment was identified as *functional rehabilitation*. Functional rehab is a way of treating the patient so that he or she can return to their individual sport fully prepared for movements required by that sport.

Over the years, investigators have looked at a variety of different potential risk factors for hamstring injuries. These have included muscle flexibility and strength, patient demographics (e.g., age, gender, educational level, type of sport), and a history of a previous hamstring (or other) injury.

It turns out the biggest risk factor for hamstring injury really is a previous hamstring strain. Athletes with at least one previous hamstring injury were two to six times more likely to have another similar (or worse) hamstring injury.

And most of those second injuries occurred soon after the first injury (within eight weeks' time). But it's not safe to say that if you have an initial injury and it's been eight weeks without a second injury, that you won't reinjure yourself. Many athletes (especially American football players) suffer a reinjury even a year (or more) later.

The hamstrings muscle is made up of several separate muscles/tendons. So one of the ways hamstring injuries have been investigated was to see if injuring one of those three parts put the athlete at greater risk for reinjury.

It turned out that the specific part of the muscle injured did NOT predict a second injury. So, that was no help. Then they looked at size and severity of the muscle/tendon tear. That didn't appear to make a difference in the same season, but size (larger strains) was a risk factor for future reinjuries (within two seasons).

Since the hamstrings is just one part of the entire leg, it makes sense that an injury somewhere else in the lower extremity could put the athlete at increased risk for hamstring injury. That idea turned out to be correct. So anyone with a previous hamstring injury or other lower quadrant injury can be considered at increased risk for a hamstrings strain.

What about hamstring flexibility? It seems that hamstring flexibility isn't as important as flexibility in other thigh muscles such as the quadriceps muscle (opposite the thigh along the front of the upper leg). Likewise, tight hip flexors (iliopsoas muscle) might make a difference. At least one study reported this factor was important in older athletes.

Of course, besides hamstring flexibility, researchers have also looked at hamstring strength as a possible contributor to hamstring tears. Studies have looked at differences in hamstring strength and body weight between athletes who got injured and those who didn't.

The results of these comparisons have been more inconsistent and less helpful in identifying risk factors for injuries. Strength ratios vary depending on speed of leg movement and arc of motion. Leg length differences (one leg shorter or longer than the other) may possibly affect the measurements taken during muscle testing. These are what researchers refer to as *confounding variables*. Their presence muddies up the water so-to-speak, making it difficult to identify the real issues that make a difference.

Researchers have also looked at race/ethnicity as a possible risk factor for hamstring injury. There is some support for the idea that black athletes of all nationalities seem to suffer more recurrent hamstring strain injuries than other groups. The reason for this is unknown.

Playing position (outfielders) for kicking sports such as American soccer and Australian football is a possible risk factor. Level of competition rather than time spent on the field in training or playing was a risk factor. And fatigue at the end of the game has been linked with increased injuries. Playing conditions such as type of turf or condition of the ground or air temperature did not pose any increased risks.

Once the risks were understood, the authors turned their attention to the prevention and management of hamstring strain injuries. Despite efforts at hamstring strengthening programs, the results are not consistent among players or across sports. And strengthening programs are not carried out in isolation. The athletes are usually also stretching, running, and lifting weights. So, it's difficult to measure the effects of a strengthening exercise protocol on hamstring function.

There was even a study looking at the effect of keeping the muscles warm with thermal shorts. Although players who didn't wear the shorts were more likely to be injured, the rate wasn't statistically significant. Players who wore the shorts once in a while seemed to have a higher rate of hamstring injury. But this could have been a coincidence or linked with something else (an unknown factor).

High-quality studies on the treatment for hamstring injuries are few and far between. The studies that were done often only followed athletes for a few weeks, so the rate of recurrence reported didn't reflect the long-term results. The most success has been seen with functional rehab including progressive agility drills and trunk stabilization (core training) exercises. Again, the follow-up time reported for these studies was very short-term.

American football players with hamstring injuries are often treated with intramuscular corticosteroid injections and sent back into the game quickly (within a week's time). But there is so much turnover in this group of patients that it's difficult to get a handle on how many recurrences there are. A second hamstring injury may result in a player being traded or let go. Follow-up can be sketchy at best with this group.

Future studies of high-quality design are needed. And not just studies of professional athletes. Their level of play and tendency to keep quiet about their injuries may not be reflective of all athletes with these injuries. It would also be helpful to find out why hamstring strains recur. Other muscle strains don't seem to have such a high rate of second injuries. What's the difference?

The authors reflect at great length in their discussion of all the variables and factors that may lead to hamstring injuries and reinjuries. There are bits and pieces of the puzzle but the big picture just isn't clear. There is some thought that athletes involved in kicking sports spend too much time and effort strengthening their quadriceps muscles, putting their hamstrings at increased risk for injury.

Muscle tightness is a particularly sticky subject. Most of these athletes are already on a stretching program. Are they really inflexible? Is inflexibility a risk factor or a result of previous injuries? Is it possible to test for hamstring tightness when it's impossible to separate out lumbar, pelvis, and leg flexibility?

The authors conclude that our current knowledge and understanding of how to prevent hamstring injuries is limited. The same is true of how to treat hamstring strains. With more and more people involved in sports, it seems a good idea to find out more about how to prevent (or treat) these common injuries.

Reference: Mathew Prior, B Physical Therapy (Hons), et al. An Evidence-Based Approach to Hamstring Strain Injury: A Systematic Review of the Literature. In *Sports Health*. March/April 2009. Vol. 1. No. 2. Pp. 154-164.

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