



Main Line Health[®]

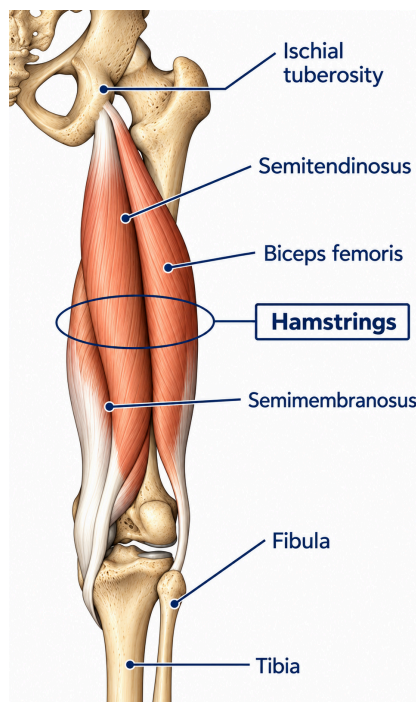
Orthopaedics & Spine

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HAMSTRING STRAIN

Understanding the Injury

The hamstrings are a group of three muscles in the back of the thigh – the biceps femoris, semitendinosus, and semimembranosus – that attach at the ischial tuberosity (the bony prominence felt under each buttock when sitting) and at the back of the knee at the tibia. Contraction of the hamstrings flexes the knee, extends the hip, and controls the pelvis when bending forward with the knees straight; during walking and running, they decelerate the leg as it swings forward to strike the ground.

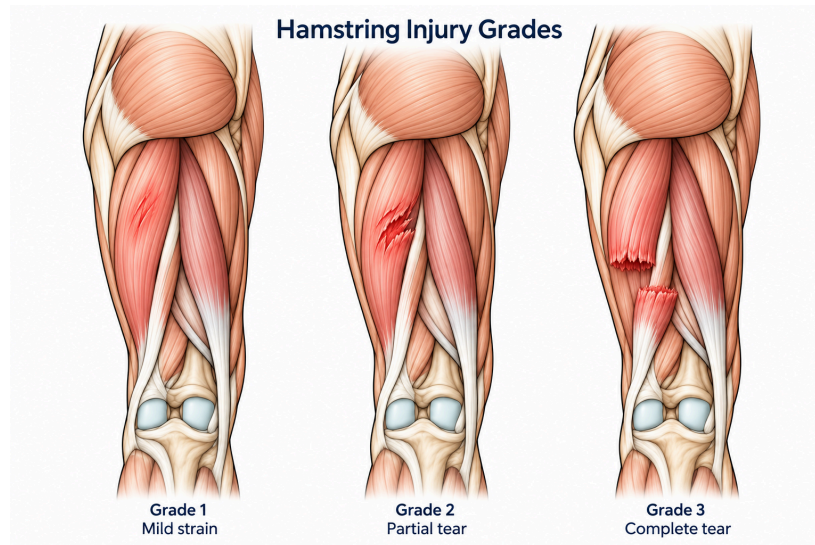


A hamstring strain is an excessive stretch or tearing of these muscle fibers or the tissue surrounding them, and it most often occurs during fast running or sprinting, when the greatest force demands are placed on the muscle. Strains can also occur with jumping or other quick starts and stops. Soccer, football, rugby, baseball, basketball, water skiing, and track and field are considered high-risk sports, and runners are especially prone to chronic strains due to the repetitive nature of the sport. An imbalance between hamstring and quadriceps strength also increases the risk of a strain.

Grading a Hamstring Strain

Hamstring strains are classified by severity, and the grade determines the expected recovery time.

- First Degree (Mild): A structural disruption of less than 5 percent of the muscle — a common "pulled muscle." Most patients return to sports within 1 to 3 weeks.
- Second Degree (Moderate): A more significant, but still partial, muscle tear that typically requires 3 to 6 weeks of rest and recovery before returning to full activity.
- Third Degree (Severe): A complete tear of the muscle-tendon unit. Recovery can take many weeks to months.



Treatment

Rest from the activity that caused the strain allows healing to occur. Ice should be applied to the painful area for 20 minutes immediately after injury, and periodically 2 to 3 times a day afterward, to control swelling and pain. Heat should be avoided for the first 7 to 10 days, since it may increase swelling and bleeding within the muscle. An elastic wrap or compression sleeve can help control swelling — if it causes increased discomfort or numbness and tingling anywhere in the leg, it is too tight. Elevating the leg periodically also helps control swelling.

Important Precautions

Aggressive stretching — beyond the point of mild discomfort — should be avoided early on, as it may disrupt healing; no stretching or resistive exercise should be performed during the first 3 weeks after injury. As a general rule, any activity that causes pain at or near the injured site may be causing further injury and will only slow your recovery. A gradual, sport-specific conditioning program, including a proper warm-up and stretching, will help prepare the hamstring for the demands of returning to athletics.

Expected Outcomes

Most patients recover well from a hamstring strain when this rehabilitation protocol is followed closely and progression is guided by symptoms rather than the calendar. Recovery

time depends on the grade of injury — generally 1 to 3 weeks for a mild strain, 3 to 6 weeks for a moderate strain, and many weeks to months for a severe strain. Returning to sport before the hamstring has fully healed is one of the most common causes of re-injury, so each phase of this protocol should be pain-free before advancing to the next.

Warning Signs During Recovery

Most patients recover fully from a hamstring strain, but progressing too quickly can lead to re-injury and a longer overall recovery.

Contact our office or your physical therapist if you notice any of the following:

- Increasing pain, swelling, or bruising at the injury site
- A new limp or change in your walking pattern
- Loss of range of motion you had previously regained
- Symptoms that fail to improve, or worsen, after 1 to 2 weeks of rest

If any of these occur, stop the aggravating activity, resume icing and rest, and follow up with our office before continuing your rehabilitation program.

HAMSTRING STRAIN REHABILITATION PROTOCOL

This protocol is symptom-guided rather than strictly time-based — let pain and swelling determine how quickly you advance, not the calendar below. The timeline shown is typical for a moderate to severe (grade 2 or 3) strain; after a mild (grade 1) strain, rehabilitation can usually begin at Phase III. Exercises are physician-directed and largely patient-led — formal physical therapy is not required for every patient, but please provide your therapist with a copy of this protocol if one is involved in your care.

The primary goals are to:

Protect the healing muscle from re-injury

Control pain and swelling

Gradually restore motion, strength, and conditioning

Safely return to running, sport, and full activity

PHASE I: PROTECTION AND REST (Week 1)

Goals

- Protect the healing muscle from further injury
- Control pain and swelling

Treatment

- Rest from painful activities, ice for 20 minutes 3 times a day, and a compression wrap or neoprene sleeve.

Advancement Criteria

- Pain and swelling controlled at rest

PHASE II: EARLY MOTION (Weeks 2–3)

Goals

- Restore pain-free active range of motion
- Avoid re-injury while beginning gentle movement

Exercises

- Ice once a day for 20 minutes after exercise, and active range-of-motion exercises 1 to 2 times a day for 10 to 20 repetitions, including quad sets, heel slides (towel-assisted if painful), toe raises, standing hamstring curls, and standing or prone straight-leg-raise hip extension. A stationary bicycle may be used for 10 minutes with no resistance if pain-free.

Precautions

- No stretching during this phase.

Advancement Criteria

- Full, pain-free active range of motion

PHASE III: STRENGTHENING BEGINS (Weeks 4–6)

Goals

- Begin gentle strengthening and conditioning
- Progress toward walking and light jogging

Exercises

- Gentle strengthening 1 time a day, 5 days a week, for 15 to 30 repetitions, starting with a 1-pound ankle weight for standing hamstring curls and standing or prone straight-leg-raise hip extension, adding 1 pound per week up to 5 pounds. Stationary cycling can increase by 1 minute per session up to 30 to 40 minutes, and slow treadmill walking can progress from 5 minutes to 20 minutes, or the Return to Walk/Run Program may begin. Gentle, pain-free stretching may be performed 2 times a day.

Precautions

- Do not stretch beyond mild discomfort, and stop any exercise that causes pain.

Advancement Criteria

- Able to walk and cycle pain-free
- Tolerating gentle stretching without discomfort

PHASE IV: RETURN TO RUNNING AND SPORT (7+ Weeks)

Goals

- Rebuild hamstring and quadriceps strength in proper balance
- Progress to full-speed running and sport-specific training

Strengthening

- Gradual hamstring and quadriceps strength training, 3 times a week, maintaining a 4:3 quadriceps-to-hamstring strength ratio
- Stationary cycle and gentle hamstring stretching
- Begin the Return to Full-Speed Running Program once able to jog 1 mile pain-free

Return to Activity

- Once running pain-free and without swelling, progress to the Return to Sprint Program and begin sport-specific training
- Expect a continued, gradual return to full competition over several additional weeks

Advancement Criteria

- Jogging 1 mile pain-free
- Progressing through the return-to-running and return-to-sprint programs without pain or swelling
- Cleared by Dr. Fliegel to return to full, unrestricted sport

Key Rehabilitation Principles

- Progression through this protocol should always be guided by symptoms, not the calendar — advance to the next step only when the current one is pain-free and swelling-free, and go back a step if an activity causes pain, swelling, or a limp.
- An imbalance between hamstring and quadriceps strength increases the risk of re-injury; aim for an equal amount of exercise for both muscle groups, and follow the Progressive Resistance Exercise principle — increasing resistance gradually, in increments of about 5 to 10 percent, no more often than every 10 to 14 days.
- Always warm up until you break a sweat and stretch gently before exercise, then stretch and ice again afterward.
- Returning to sport before the hamstring has fully healed is one of the most common causes of re-injury — patience during this protocol gives the muscle the best chance to heal completely.
- Contact our office if you experience increasing pain, swelling, bruising, or an inability to bear weight on the leg.

