

## Hamstring Case Scenario

### Patient History:

A 32-year-old male recreational soccer player presents with acute right posterior thigh pain that began one week ago. He describes a sudden sharp pain in his posterior thigh while sprinting during a match. His pain is intermittent, sharp, and ranges from 0-8/10, limiting his ability to walk without discomfort. He has a history of a hamstring strain two years ago, which resolved after physical therapy, and he returned to recreational soccer without limitation. Currently he is having difficulty walking and ambulating stairs. He also reports that it is painful to sit for long periods at work due to the pain. He is unable to run or participate in soccer due to the pain.

### Systems Review:

The patient is in good general health. He denies recent illness, surgery, or cardiovascular concerns. He takes no daily medications and reports no use of supplements. He is neurovascularly intact in the lower extremities, and vital signs are within normal limits. His BMI is 31. He is attempting to reduce his weight by playing soccer.

### Tests and Measures:

On observation, the patient demonstrated an antalgic gait with reduced right stance time. Diffuse ecchymosis was visible along the right posterior thigh, extending from the mid-hamstring belly to the popliteal fossa. Palpation revealed diffuse tenderness throughout the mid-belly of the right lateral hamstrings.

Functionally, single-leg stance on the right was limited because of impaired balance and trunk control. The "taking off shoe test" reproduced posterior thigh pain, and step-up onto an 8-inch stool provoked pain rated 2-3/10.

Range-of-motion testing showed hip flexion of 125° on the left and 120° on the right with pain at end range. Hip abduction measured 45° bilaterally, while adduction was 20° bilaterally. Internal rotation was 30° bilaterally with pulling discomfort on the right, and external rotation was 45° bilaterally and pain-free. The active knee extension test (hamstring 90-90) was 80° on the left and 55° on the right, indicating a 25-degree deficit.

Strength testing with a handheld dynamometer revealed knee flexion strength of 28 kilograms on the left and 15 kilograms on the right with pain. Hip extension strength was 5/5 on the left

and 4/5 on the right with pain. Hip abduction strength was 4+/5 bilaterally without pain, and hip external rotation strength was 5/5 bilaterally.

Pain was reproduced with resisted knee flexion and during eccentric hamstring control tasks.

1. Which of the following details in the patient case is not a risk factor for a hamstring strain?
  - a. Age: 32.
  - b. Recreational soccer player.
  - c. Previous hamstring injury.
  - d. BMI: 31.

The correct answer is **d. BMI: 31**. According to the 2022 hamstring string CPG, age over 23 years old, previous hamstring injury, and participating activities of high-speed running demand like soccer are known risk factors for hamstring strains. Evidence does not support weight or body mass index as risk factors of hamstring strains.

2. Based on the information in the case, which of the following would be best to describe the type and grade of injury?
  - a. Semimembranosus grade II.
  - b. Semimembranosus grade III.
  - c. Biceps femoris grade II.
  - d. Biceps femoris grade III.

The correct answer is **c. Biceps femoris grade II**. The patient demonstrates a sudden onset of posterior thigh pain during sprinting with diffuse ecchymosis, tenderness, weakness, and a 25° deficit on the active knee extension (90-90) test, which is consistent with a grade II hamstring strain. The “taking off the shoe test” reproduces pain and has been shown to be highly accurate for identifying biceps femoris involvement, making this the most likely muscle injured. 

3. Which of the following initial interventions are most appropriate for this patient?
  - a. Trigger point release to the hamstring muscles.
  - b. Hamstring stretching progression.
  - c. Eccentric loading.
  - d. Isometric hamstring activation.

The correct answer is **d. Isometric hamstring activation**. According to the Hamstring Strain CPG (2022), early management should emphasize pain control and gentle activation. Stretching and eccentric loading are not appropriate in the acute phase because they place excessive strain on the healing tissue. Isometrics provide a safe way to maintain some muscle activation, reduce pain, and begin load tolerance without lengthening the injured muscle. Soft tissue mobilizations may be used later in rehab to reduce adhesions, but they are not considered the most appropriate initial intervention.

4. Which intervention is best supported by evidence as a preventative activity of future hamstring strains?
- Nordic hamstring exercises.
  - Side-lying bridges.
  - Neural mobilizations.
  - Split squats.

The correct answer is **a. Nordic hamstring exercises**. While each of these interventions may have value in a comprehensive rehabilitation program, the Nordic hamstring exercise is best supported by high-quality evidence as a preventative strategy. Its specificity and progressive eccentric loading directly target hamstring muscle architecture and reduce reinjury risk. Trunk stabilization is also recommended, but exercises such as side-lying bridges are typically introduced early and then progressed to more challenging core control tasks. Neural mobilizations may be useful in the acute and subacute phases to address pain and prevent adhesions but are not primary for prevention. Split squats incorporate hamstring activity but lack the direct, evidence-based effectiveness of Nordic hamstring training in reducing future strains.

## References

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