

## **Post-Operative Instructions** **Proximal Hamstring Repair**

### **Day of surgery**

- A. Diet as tolerated
- B. Pain medication as needed every 4-6 hours (refer to pain medication sheet).
- C. Make sure you have a physical therapy post-op appointment scheduled during the first week after surgery.
- D. If you were given a brace this should be worn at all times except during sleep.

### **First Post-Operative Day**

- A. Pain medication as needed.

### **Second Post-Operative Day Until Return Visit**

- A. Unless otherwise noted, weight-bearing is toe-touching only for the first 6 weeks after surgery. After 6 weeks, you can bear as much weight on the affected leg as you can tolerate. Most patients use crutches for the first 2-3 weeks.
- B. Call our office @ 646-501-7223 option 4, option 2 to confirm your first postoperative visit, which is usually about 1-2 weeks after surgery if you have not been given a time. If you are experiencing any problems, please call our office or contact us via the internet at [www.newyorkortho.com](http://www.newyorkortho.com).
- C. The initial Aquacel dressing should be kept on for the first 2 weeks after surgery. After 2 weeks, you may remove the Aquacel dressing and shower. Apply 4x4 (or similar size) Telfa or Tegaderm to these wounds prior to showering and when showering is complete apply fresh dry Telfa or Tegaderm.
- D. If showering is begun before 2 weeks (earliest allowed is third postoperative day), the Aquacel dressing MUST be kept dry.

**\*Telfa Adhesive Island Dressings or Tegaderm+Pads may be purchased online and at select pharmacies.**





## Dr. Laith M. Jazrawi

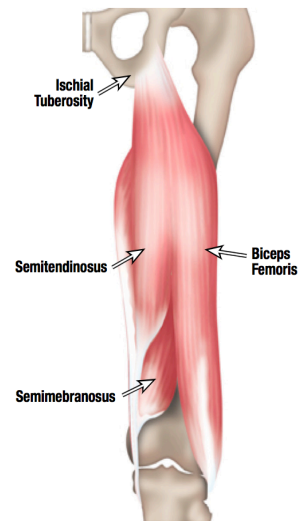
Chief, Division of Sports Medicine  
Associate Professor Department of Orthopaedic Surgery

# Rehabilitation Protocol Following Proximal Hamstring Primary Repair

The hamstring muscle group consists of three muscles: the biceps femoris, semitendinosus and semimembranosus. All three of these muscles originate from the ischial tuberosity of the pelvis and then insert below the knee with the biceps femoris attaching on the fibula and the semimembranosus and semitendinosus attaching on the tibia (Figure 1). These muscles cross the hip and the knee, and therefore can affect both hip and knee motion. Acute hamstring strains are common in sports that involve sprinting, kicking and high-speed skilled movements.

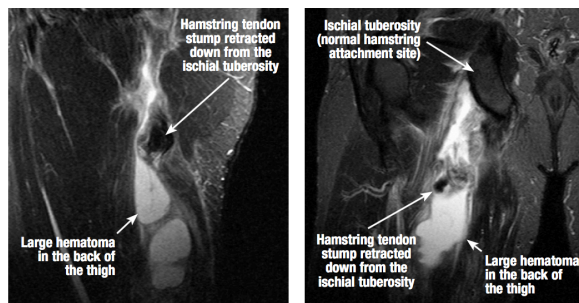
A National Football League team published injury data for their team during pre-season training camp from 1998-2007.<sup>1</sup> Hamstring strains were the second most common injury, only surpassed by “knee sprains”.<sup>1</sup> Numerous studies have shown that hamstring strains are one of the most common injuries in sprinting sports, soccer, rugby and Australian rules football.<sup>1-12</sup> Hamstring strains primarily occur at the proximal musculotendon junction.<sup>13</sup> Proximal musculotendon strain injuries have been shown to be treated effectively with rehabilitation.<sup>1, 8</sup>

Much less common, but most often much more severe, are the hamstring injuries involving complete avulsion of the hamstring complex off the ischial tuberosity. When this occurs a large amount of bleeding (hematoma) will form in the back of the thigh and the tendon will move down the thigh, retracting away from the ischial tuberosity (Figures 2 and 3). Almost all injuries occur from a slip or a fall that creates forceful hip flexion with simultaneous knee extension, many of these during sporting activities.



**Figure 1** Normal hamstring anatomy. Three muscles (semimembranosus, semitendinosus and biceps femoris) originate from the pelvis (ischial tuberosity).

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**Figures 2 and 3** MRI demonstrating a complete avulsion of the hamstring tendon from the ischial tuberosity.

## Rehabilitation Protocol Following Proximal Hamstring Primary Repair

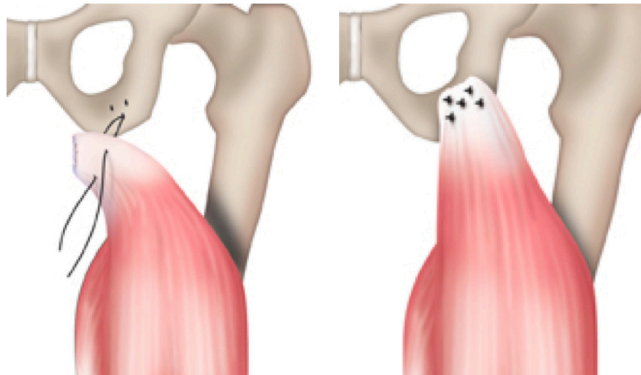
In addition to falls this injury can occur with waterskiing starts and bull riding.<sup>14-15</sup> These complete avulsions result in significant or complete loss of hamstring function depending on how many of the tendons are avulsed. This can lead to poor leg control and difficulty even walking. Because of the significant structural damage and resultant disability, these injuries are often treated with open surgical repair.

The clinical indications for surgical repair are complete hamstring avulsion of all 3 tendons or significant retraction with less than 3 tendons avulsed. Outcome studies indicate that if surgery is performed shortly after injury, the outcome is superior to those whose surgery was delayed several months. Acute surgical repair is performed by suturing the torn tendons to suture anchors placed in the bone at the anatomical origin. This usually requires 2-4 suture anchors and Panacryl or Ethibond sutures (Figures 4 and 5).<sup>16-17</sup>

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Post-operatively crutches are used to assist in walking for the first few weeks. A brace or protective device also may be used to protect the hamstring. One factor in this decision is the time of year (snow / ice), as most reported episodes of early failure are related to slipping and falling. Another factor, which is assessed during surgery, is the ease with which the torn tendon can reach its original insertion on the pelvis. If the tendon was significantly retracted there is a greater likelihood of longer post-operative protection.



**Figure 4:** Sutures extending out to the torn tendon stump from anchors placed in the ischial tuberosity (pelvic bone).

**Figure 5:** Sutures tied off to approximate the torn tendon to the ischial tuberosity (pelvic bone).

## Rehabilitation Protocol Following Proximal Hamstring Primary Repair

### Phase I (Surgery to 6 weeks after surgery)

Goals	<ul style="list-style-type: none"> <li>○ Protection of surgical repair</li> <li>○ Progress ROM by 30 degrees per week to full ROM by 8 weeks</li> <li>○ Cryotherapy unit to be used 4-6 times per day for 20 minutes</li> <li>○ Crutches/non-weight bearing for 4 weeks with progression to full-weight bearing</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>○ Non-weight bearing with crutches for 6 weeks</li> <li>○ No active hamstring contraction</li> <li>○ No hip flexion greater than 45 degrees</li> <li>○ Knee extension limited pending intra-operative tension on the repair</li> </ul>
Suggestions	<ul style="list-style-type: none"> <li>○ Cryotherapy for pain and swelling control 3-5x a day</li> <li>○ Light desensitization massage to the incision and posterior hip</li> <li>○ Scar massage</li> <li>○ Silicon patch over incision (if open repair)</li> </ul>

### Phase II (6 weeks to 8 weeks following surgery)

Goals	<ul style="list-style-type: none"> <li>○ Restore normal gait</li> <li>○ Pain free and normal functional ADLs</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>○ Monitor tenderness of surgery site</li> <li>○ No hamstring flexibility or stretching exercises are to be performed during this phase. Lengthening of the repair and return of normal hamstring flexibility will be allowed to occur on its own</li> </ul>
Range of Motion Exercises	<ul style="list-style-type: none"> <li>○ Increase Forward Flexion, Internal/External Rotation to full motion as tolerated</li> </ul>
Therapeutic Exercises	<ul style="list-style-type: none"> <li>○ Restore normal gait pattern (emphasize good leg control with extension of knee during swing phase and heel strike)</li> <li>○ Improve ADL function i.e sit-&gt;stand, stairs, etc.</li> <li>○ Begin light hamstring strengthening with low loads, high reps and high frequency by performing hamstring leg curls in standing with the hip extended. Start with zero resistance then progress as tolerated 1lb at a time 2 sets/20, 4-5x a day</li> <li>○ Begin total leg strengthening: heel raises, quad sets, short arc squads, general hip strengthening in side lying, single leg balance for proprioception</li> </ul>
Other Suggestions	<ul style="list-style-type: none"> <li>○ Light desensitization massage to the incision and posterior hip</li> <li>○ Scar massage</li> </ul>

# Rehabilitation Protocol After Arthroscopic SLAP Repair

## Phase III (8 weeks to 12 weeks following surgery)

Goals	<ul style="list-style-type: none"> <li>○ Pain-free performance of non-impact aerobic activities</li> <li>○ Unrestricted ADLs at home or work</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>○ Monitor hamstring flexibility and tenderness of surgery site</li> </ul>
Therapeutic Exercises	<ul style="list-style-type: none"> <li>○ Begin non-impact aerobic conditioning as tolerated with any of the following: stationary bike, stairmaster, elliptical trainer, nordic track, aquatic therapy with swimming or functional activities in the water (avoid forceful, explosive, or repetitively strainful activities)</li> <li>○ Continue to progress TLS as tolerated: ¼ squats, stepdowns, leg press, knee extensions, heel raises, hip abductor in standing with tubing or machine, balance and proprioceptive training</li> <li>○ Progress hamstring strengthening in standing by increasing weight or initiating TheraBand</li> <li>○ Patient may progress to prone positioning on a machine and then to seated leg curls (with hip flexed at 90 degrees) on a machine or with tubing</li> </ul>

## References

- Feeley BT, Kennelly S, Barnes RP, et al. Epidemiology of National Football League Training Camp Injuries From 1998 to 2007. *Am J Sports Med.* Apr 28 2008.
- Gabbe BJ, Finch CF, Wajswelner H, Bennell KL. Predictors of lower extremity injuries at the community level of Australian football. *Clin J Sport Med.* Mar 2004;14(2):56-63.
- Orchard J, Best TM, Verrall GM. Return to play following muscle strains. *Clin J Sport Med.* Nov 2005;15(6):436-441.
- Orchard J, Marsden J, Lord S, Garlick D. Preseason hamstring muscle weakness associated with hamstring muscle injury in Australian footballers. *Am J Sports Med.* Jan-Feb 1997;25(1):81-85.
- Orchard J, Steet E, Walker C, Ibrahim A, Rigney L, Houang M. Hamstring muscle strain injury caused by isokinetic testing. *Clin J Sport Med.* Oct 2001;11(4):274-276.
- Orchard JW. Intrinsic and extrinsic risk factors for muscle strains in Australian football. *Am J Sports Med.* May-Jun 2001;29(3):300-303.
- Orchard JW, Best TM. The management of muscle strain injuries: an early return versus the risk of recurrence. *Clin J Sport Med.* 2002;12(1):3-5.
- Sherry MA, Best TM. A comparison of 2 rehabilitation programs in the treatment of acute hamstring strains. *J Orthop Sports Phys Ther.* Mar 2004;34(3):116-125.
- Verrall GM, Kalairajah Y, Slavotinek JP, Spriggins AJ. Assessment of player performance following return to sport after hamstring muscle strain injury. *J Sci Med Sport.* May 2006;9(1-2):87-90.
- Verrall GM, Slavotinek JP, Barnes PG. The effect of sports specific training on reducing the incidence of hamstring injuries in professional Australian Rules football players. *Br J Sports Med.* Jun 2005;39(6):363-368.
- Verrall GM, Slavotinek JP, Barnes PG, Fon GT. Diagnostic and prognostic value of clinical findings in 83 athletes with posterior thigh injury: comparison of clinical findings with magnetic resonance imaging documentation of hamstring muscle strain. *Am J Sports Med.* Nov-Dec 2003;31(6):969-973.
- Brooks JH, Fuller CW, Kemp SP, Reddin DB. Incidence, risk, and prevention of hamstring muscle injuries in professional rugby union. *Am J Sports Med.* Aug 2006;34(8):1297-1306.
- Asklund CM, Tengvar M, Saartok T, Thorstensson A. Acute First-Time Hamstring Strains During High-Speed Running: A Longitudinal Study Including Clinical and Magnetic Resonance Imaging Findings. *Am J Sports Med.* Dec 14 2006.
- Chakravarthy J, Ramisetty N, Pimpalnerkar A, Mohtadi N. Surgical repair of complete proximal hamstring tendon ruptures in water skiers and bull riders: a report of four cases and review of the literature. *Br J Sports Med.* Aug 2005;39(8):569-572.
- Sallay PI, Friedman RL, Coogan PG, Garrett WE. Hamstring muscle injuries among water skiers. Functional outcome and prevention. *Am J Sports Med.* Mar-Apr 1996;24(2):130-136.
- Sarimo J, Lempainen L, Mattila K, Orava S. Complete proximal hamstring avulsions: a series of 41 patients with operative treatment. *Am J Sports Med.* Jun 2008;36(6):1110-1115.
- Wood DG, Packham I, Trikha SP, Linklater J. Avulsion of the proximal hamstring origin. *J Bone Joint Surg Am.* Nov 2008;90(11):2365-2374.
- Klinge KE, Sallay PI. Surgical repair of complete proximal hamstring tendon rupture. *Am J Sports Med.* Sep-Oct 2002;30(5):742-747.

## Post-Operative Rehabilitation Protocol: Proximal Hamstring Tendon Repair

**Patient Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

### Phase 1 (Weeks 0 – 6)

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#### **Weightbearing**

No weightbearing with crutches	Weeks 0 – 6
No active hamstring contraction	Weeks 0 – 6
No hip flexion > 45°	Weeks 0 – 6
No knee extension > 45°	Weeks 0 – 6

#### **Hinged Knee Brace**

Locked at 45° for ambulation and sleeping, remove for hygiene	Weeks 0 – 2
Set to range from 45 – 140° for ambulation, remove for sleeping and hygiene	Weeks 2 – 6
Discontinue brace	Week 6

#### **Range of Motion (ROM)**

45°	Weeks 0 – 2
45 – 140°	Weeks 2 – 6

#### **Therapeutic Exercises**

Heel props with quadriceps sets (supine position only)	Weeks 2 – 6
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### Phase 2 (Weeks 6 – 12)

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#### **Weightbearing**

As tolerated	Weeks 6 – 12
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#### **Range of Motion**

Progress by 30° per week to full active ROM	Weeks 6 – 12
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#### **Therapeutic Exercises**

Progress to closed chain extension exercises, begin quadriceps strengthening	Weeks 8 – 12
Lunges (0 – 90°), leg press (0 – 90°)	Weeks 8 – 12
Proprioception exercises	Weeks 8 – 12
Stationary bike	Weeks 8 – 12

### Phase 3 (Months 3 – 6)

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#### **Weightbearing**

Full weightbearing with normal gait patterns	Months 3 – 6
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#### **Range of Motion**

Full ROM	Months 3 – 6
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#### **Therapeutic Exercises**

Continue quadriceps and hamstring strengthening

Months 3 – 6

Focus on single-leg strength

Months 3 – 6

Sport-specific drills

Months 4 – 6

Begin maintenance program for strength and endurance

Month 6

**Activity Goals**

Begin jogging

Month 3 – 4

Return to sport

Months 6 – 9

**Signature:** \_\_\_\_\_**Date:** \_\_\_\_\_