Technical Note

Recurrent and Chronic Complete Ruptures of the Proximal Origin of the Hamstring Muscles Repaired With Fascia Lata Autograft Augmentation

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Abstract: Hamstring injuries are common, especially among athletes. A complete rupture of the proximal hamstring muscles requires surgical intervention. In this report we describe a reconstruction method for a complete proximal hamstring rupture using fascia lata autograft augmentation in addition to suture anchors. This method can be advocated in cases in which the primary repair has failed or in chronic injuries where a large defect between the distally retracted tendons and the ischial tuberosity prevents anatomic reinsertion. In our technique, a muscle-tendon flap is first created from the retracted tendon stump, turned proximally, and fixed to the ischial tuberosity by suture anchors. The fascia lata graft is then fixed from the midpart to the ischial tuberosity via the same sutures. The other sleeve of the graft is folded on the ventral side of the ruptured tendon stump and fixed by use of absorbable sutures. Then the other sleeve is folded on the dorsal side and fixed in the same manner. Finally, the fixation can still be reinforced with additional absorbable sutures passing through both sleeves of the graft, as well as the muscle-tendon bridge and the tendon stump. **Key Words:** Hamstring—Rerupture—Fascia lata—Autograft—Reoperation.

The hamstring is one of the most frequently injured muscles in athletes.[1] Most of these injuries are transient and are treated by conservative means with a good response. Complete rupture of the proximal hamstring muscles, however, requires surgical intervention.[2-6] Despite some case series reporting good to excellent results with refixation of complete ruptured proximal hamstring muscles, to our knowledge, rerupture of the proximal hamstring muscles after primary repair has not been reported previously.

This report describes a surgical reconstruction technique for complete proximal hamstring rupture by use of fascia lata autograft augmentation. We have used this reconstruction technique in 5 cases. Four patients had a complete rerupture of the proximal hamstring muscles after primary repair. In the fifth case we used this technique in a patient who had a complete rupture of the proximal hamstring muscles with a 6-year delay between the injury and the operation.

Although the use of fascia lata autograft has been reported in augmenting primary repairs in 3 patients with proximal hamstring muscle ruptures,[4,5] to our knowledge, the detailed surgical repair technique using fascia lata autograft has not been previously described.

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Supported by the Satakunta Central Hospital District and the Finnish Cultural Foundation. The authors report no conflict of interest. Research was performed at Mehiläinen Sports Trauma Research Center, Mehiläinen Hospital and Sports Clinic, Turku, Finland.

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Cite this article as: Lempainen L, Sarimo J, Orava S. Recurrent and chronic complete ruptures of the proximal origin of the hamstring muscles repaired with fascia lata autograft augmentation. Arthroscopy 2007;23:441.e1-441.e2 [doi:10.1016/j.arthro.2006.07.044].

0749-8063/07/2304-6139$32.00/0

doi:10.1016/j.arthro.2006.07.044

TECHNIQUE

Surgery is performed with the patient under spinal anesthesia. The patient is placed in a prone position. The affected leg is prepped and draped in a sterile manner to allow free movement. The foot rests against a distal support that maintains the knee at 30° of flexion. A vertical skin incision is made over the posterior thigh, starting from the ischial tuberosity and extending approximately 15 cm distally. The lower edge of the gluteus maximus muscle is freed. The posterior cutaneous femoral nerve is identified and spared. Fasciotomy is done distally, approximately 25 cm from the ischial tuberosity, which is exposed by superiorly retracting the inferior border of the gluteus maximus muscle. The torn hamstring muscles, which have retracted from the ischial tuberosity, are identified.

The sciatic nerve is exposed lateral to the ischial tuberosity, and neurolysis is done. In recurrent ruptures and in chronic cases the sciatic nerve is often surrounded by tight adhesions and scar. Torn and distended sciatic nerve branches going into the hamstring muscles may be seen. In these cases the proximal hamstring muscles are denervated and may look wooden, like noncontracting connective tissue.

The retracted hamstring muscles and their proximal tendons are freed and mobilized. Denervated, noncontracting muscle tissue is spared as much as possible. Old suture material and degenerative tissue are excised. The bony surface of the ischial tuberosity is debrided. Part of the retracted tendon stump is freed to reach the ischial tuberosity, and a muscle-tendon "bridge" is created (Fig 1). To avoid tension, 3 or 4 suture anchors (Mitek, Norwood, MA) are then attached slightly distally and medially to the original hamstring origin in the ischial tuberosity.

The gap between the ischial tuberosity and the distally retracted tendon stump is measured by pulling the muscles down during a flexion of the knee. A graft is harvested from the iliotibial band in the midfemur through a lateral incision. The size of the graft should be approximately 5 × 20 cm. The defect in the fascia is not closed. A drain is placed, and the skin is closed.

The muscle-tendon bridge is fixed to the ischial tuberosity by suture anchors. The graft is then fixed from the midpart to the ischial tuberosity via the same sutures. The other sleeve of the graft is folded on the ventral side of the ruptured tendon stump and is fixed by use of absorbable sutures (Fig 2). The other sleeve is then folded on the dorsal side and fixed in the same manner. The fixation can still be reinforced with additional absorbable sutures passing through both sleeves of the graft, as well as the muscle-tendon bridge and the tendon stump (Fig 3). Tension of the refixed hamstring muscles is estimated with the passive movements of the knee joint. Hemostasis is checked, and a drain is placed. The skin is closed with nonabsorbable sutures. A dry sterile bandage is ap-

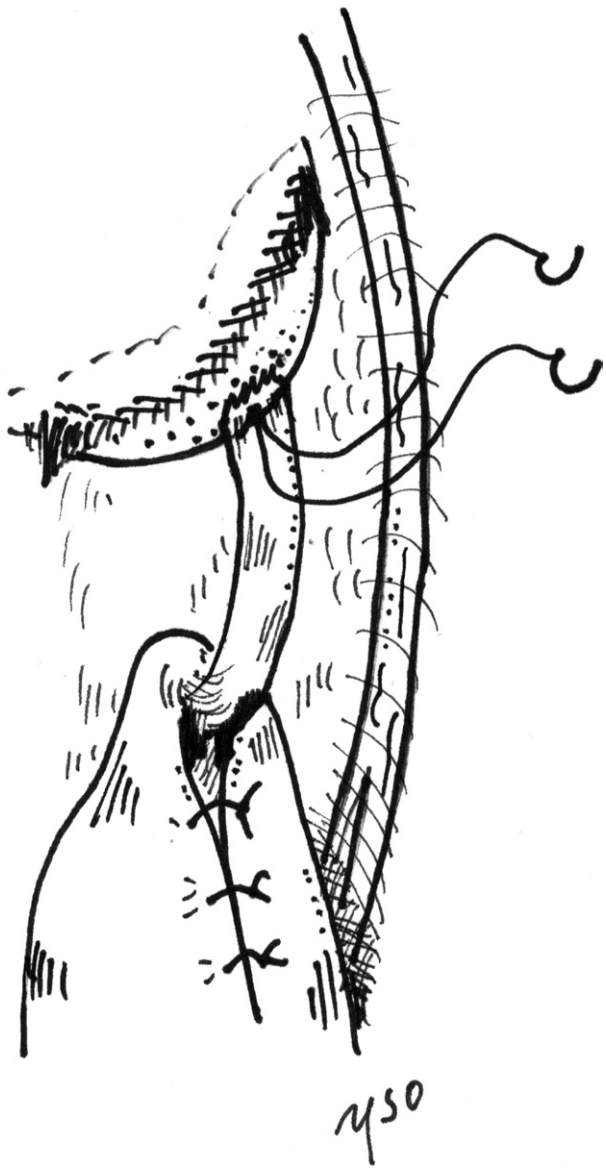

FIGURE 1. Complete rupture of proximal origin of right hamstring muscles. The torn hamstring muscle stump has retracted from the ischial tuberosity. The muscle-tendon bridge is created from the retracted hamstring muscles and fixed to the ischial tuberosity with suture anchors. The sciatic nerve is exposed lateral to the ischial tuberosity.

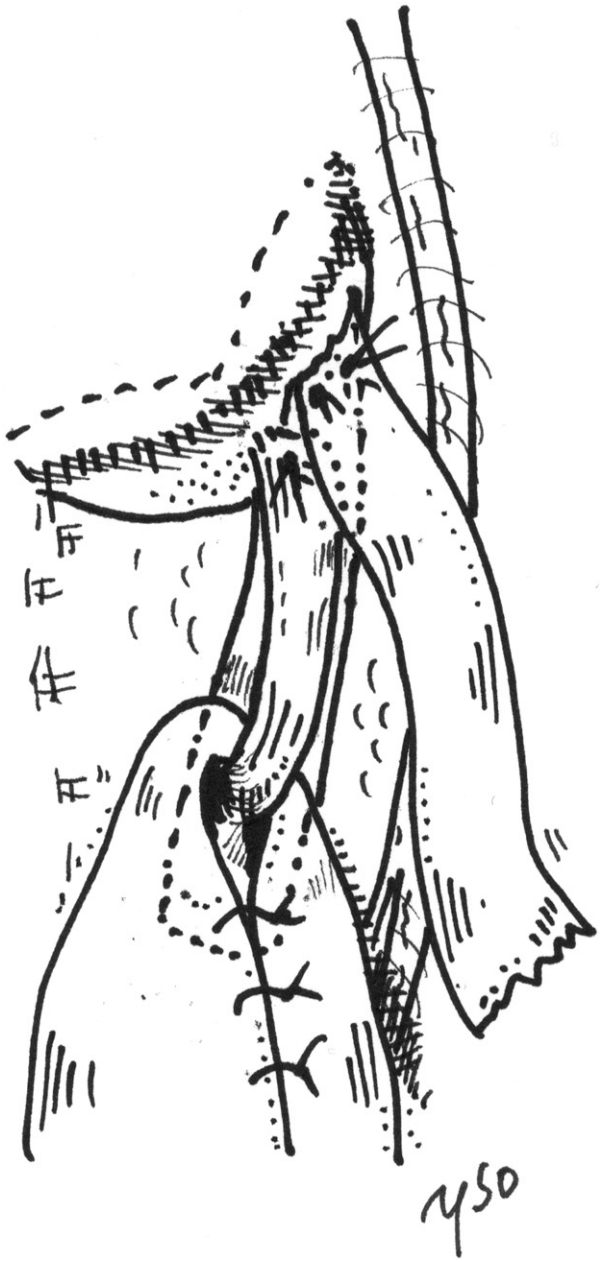

FIGURE 2. The graft is fixed from the midpart to the ischial tuberosity via suture anchors. The other sleeve of the graft is folded on the ventral side of the ruptured tendon stump and is fixed by use of absorbable sutures.

plied, and the operative leg is draped by elastic compression.

No postoperative immobilization, casts, or orthoses are used routinely at our clinic. Sutures are removed 10 to 14 days postoperatively, and an elastic bandage is used for 2 to 3 weeks. The patients are discharged on the next day after surgery.

For the first 3 weeks, no weight-bearing is allowed. Partial weight-bearing is begun after 3 weeks, and full weight-bearing is allowed and the use of crutches is discontinued 5 to 6 weeks after surgery according to the patient's progress. Sitting and full extension of the

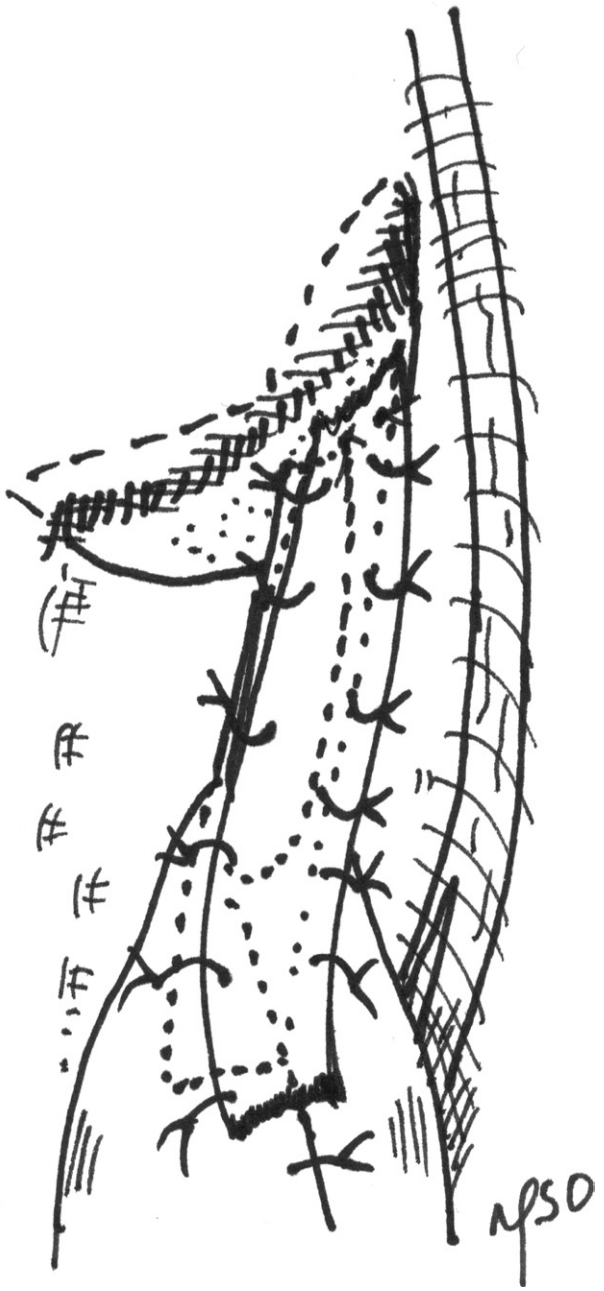

FIGURE 3. Complete rupture of the proximal origin of the right hamstring muscle has been reconnected to the ischial tuberosity with a fascia lata autograft. The fixation is still reinforced with additional absorbable sutures passing through both sleeves of the graft, as well as the muscle-tendon bridge and the tendon stump.

hip and knee are avoided for the first 3 postoperative weeks, and while the patient is lying in bed, the hip and knee are kept in approximately 30° of flexion during the first 3 to 4 weeks. Isometric exercise of the hamstring muscles is recommended after 4 weeks, and light swimming and water training are recommended after 6 to 8 weeks. Bicycling with gradually increasing time and intensity is allowed 3 months from the surgery.

DISCUSSION

Complete ruptures of the proximal hamstring muscles usually occur at the tendon origin of the ischial tuberosity.[1] The typical injury mechanism is a rapid flexion of the hip with the ipsilateral knee in extension, often combined with a forceful eccentric hamstring muscle contraction.[1-4,6] Operative treatment of complete rupture of the proximal hamstring muscles has been favored by many surgeons to achieve good results.[2-6]

To our knowledge, there are no prior reports on surgical treatment of reruptures of the proximal hamstring muscles after primary surgical repair. We have used this same reconstruction technique in 5 cases, 4 of which were reruptures after surgical treatment. The fifth case was a primary repair of a chronic complete rupture. In delayed cases the surgery is technically more demanding, and anatomic apposition of the retracted muscles cannot always be achieved.

These 5 patients were treated surgically between 1995 and 2004. All had a complete proximal rupture of the hamstring muscle group. There were 3 women and 2 men with a mean age of 42 years (range, 19 to 59 years). Two of the primary injuries occurred during sporting activities; one during water skiing and one during downhill skiing. The remaining three cases resulted from slipping or falling. In all patients the mechanism of injury was quite similar: a combination of hip flexion with the ipsilateral knee in extension.

In the chronic case the delay from injury to surgery was 6 years. The time interval from the first operation to the reoperation in the other 4 cases ranged from 7 to 24 months (mean, 14 months). All operations were performed by the senior author, an experienced orthopaedic surgeon (S.O.). The patients were followed up postoperatively at our outpatient clinic. The mean length of follow-up after surgery was 36 months (range, 9 to 61 months).

No failures of reattachment of suture anchors were suspected or noted after the primary operations. The reason for rerupture may have been elongation of poor-quality muscle and tendon tissue caused by sciatic nerve damage and denervation that occurred at the onset of injury. No new injuries had occurred in these patients before the failure of the primary repair was noted. Magnetic resonance imaging was performed in all 5 cases to confirm the diagnosis before the reoperation.

Commonly reported symptoms after the reoperation were weakness of the posterior thigh, occasional pain, and discomfort. Atrophy of the posterior thigh was noted in all patients. One patient complained of severe pain and poor leg control while walking. In this case electromyography and nerve conduction studies had already been done before the reoperation, and there was evidence of severe denervation of the proximal hamstring muscles.

However, all 5 patients believed that they had clearly benefited from the surgery. Of the 4 recreational athletes, 3 were even able to return to their sporting activities (golf, running, and downhill skiing) at a mean of 12 months (range, 6 to 18 months) after the operation. Water skiing was forbidden by the surgeon. None of the patients had been able to participate in their recreational sports before the reoperation.

CONCLUSIONS

It seems that late reconstruction of a complete proximal hamstring muscle rupture with fascia lata autograft augmentation is a useful procedure. It can be advocated in cases in which the primary repair has failed or in chronic injuries in which a large defect between the distally retracted muscle belly and the ischial tuberosity may prevent direct anatomic repair. Furthermore, although primary surgical repair without autograft augmentation is the treatment of choice in most cases of complete proximal hamstring muscle rupture, it is important to have a repertoire of techniques available in most challenging repairs. It seems that the use of fascia lata autograft augmentation enhances the strength of the proximal hamstring muscle insertion and restores better function after failure of primary repair than when these ruptures are left untreated. However, the surgeon may have to warn physically active patients about the possibility of less desirable results and advise them to avoid sporting activities that are too strenuous after the repair.

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