



## CASE REPORT

# Isolated biceps femoris rupture from the ischial tuberosity treated by surgical repair in a male rugby player

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## Introduction

Complete avulsion of the hamstring group from the ischial tuberosity is an uncommon injury which has been reported mainly in young athletes both with and without associated fracture. In this case an isolated biceps femoris avulsion from the ischial tuberosity is reported and the surgical management, including complications, is described.

## Case report

The patient was a fit 21-year-old national standard rugby player. He presented with pain in the back of his leg. He had developed pain during a tackle playing in an international match 5 days earlier. At the point of impact he felt a sudden tearing sensation in the back of the leg. Following the injury the club physician organised an ultrasound scan and subsequent magnetic resonance imaging (MRI) scan (Fig. 1).

On examination he had bruising over the posterior aspect of the upper thigh and buttock. There was no palpable defect in the thigh. Knee flexion was 4/5 compared with the other thigh, otherwise clinical examination was normal.

The ultrasound scan and subsequent MRI scan both showed complete avulsion of the long head of biceps femoris from the ischial tuberosity.

Advice was sought from international experts (M.J. Cross, D. Wood, Sydney, Australia). After consideration an operation was advised.

## Surgical technique

The patient was positioned in a prone position over pillows. A transverse incision was made in the gluteal crease which was extended down the posterolateral thigh. The inferior border of the gluteus maximus muscle was mobilised by dividing the posterior fascia and retracing the muscle superiorly. The sciatic nerve was identified and followed proximally. A neurectomy was not required. The common origin of the hamstrings was found to have retracted distally and showed some evidence of healing to adjacent tissues. The tendon stump was mobilised to allow a tension free repair to the ischial tuberosity. The tendon stump was attached to the exposed ischium by three suture anchors and non-absorbable braided sutures (Fig. 2).

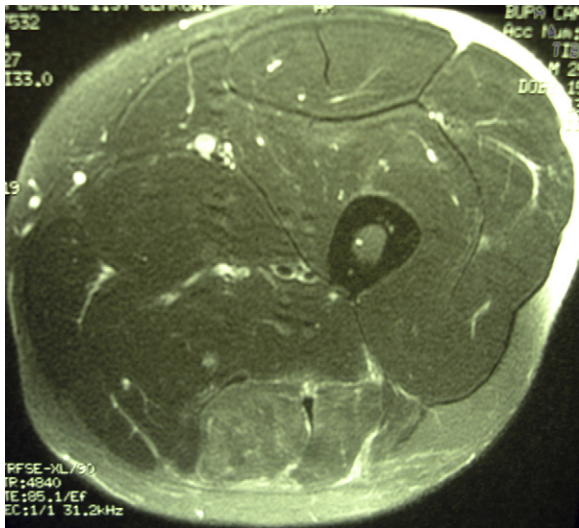
## Post-operative

Post-operatively he was placed into a brace holding the knee at 90° of flexion. Crutches were provided. He was discharged 2 days following surgery.

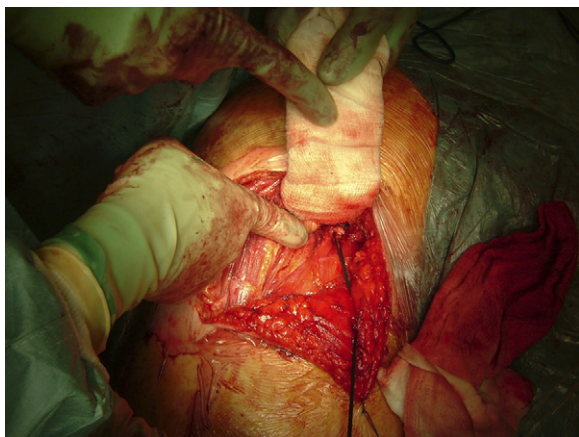
Unfortunately he fell during the second week and developed pain in his buttock. An MRI scan undertaken showing good approximation of the avulsed tendon to the ischial tuberosity. Six weeks following surgery his pain was settling. There is numbness in the territory of the posterior cutaneous

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**Figure 1** An MRI scan demonstrating the avulsed muscles.



**Figure 2** A intraoperative photograph demonstrating the origin of the avulsed tendon and the adjacent sciatic nerve.

nerve of the thigh. Following a period of physiotherapy he is now back to full training with the national squad.

## Discussion

Most hamstring injuries are strains, predominantly occurring at the musculotendinous junction.<sup>1,3</sup> Rupture of the origin of the hamstrings have been described both with and without fracture.<sup>2,4,5,7,8</sup> with the majority of reports involving avulsions of the complete hamstring origin.<sup>2,4,5,7</sup>

The diagnosis of such injuries is usually based upon the history of a forceful incident involving maximal contraction of the hamstrings with the hip flexed and then knee extended.<sup>6</sup> Water-skiers and sprinters are commonly affected but other sports have been implicated.<sup>4</sup> Examination findings usually involve massive swelling, bruising and tenderness at the site of rupture. With complete ruptures a step maybe palpable.<sup>4</sup> By contrast our patient had little in way of signs on clinical examination, possibly as this involves

only biceps femoris. In all cases, MRI scanning is very useful to confirm the diagnosis and site and extent of the tear.<sup>1</sup>

Patients who have suffered this injury appear to benefit from surgical repair as those that have been treated non-operatively appear to have a persisting functional deficit.<sup>2,7</sup> Early repair is to be advocated as this allows the avulsed portion to be mobilised much more easily. In contrast delayed repair needs a more extensive approach and dissection.<sup>4,6</sup>

Orava et al. found that in their series of eight patients with proximal hamstring avulsions, five involved solely the origin biceps femoris. Within these patients, the only case in which the avulsed biceps femoris could be reattached to its origin was the patient that was operated upon on the day of injury. In the remainder a delay of only 7 days meant that that the biceps could not be mobilised sufficiently. In these cases the tendon was sutured to neighbouring muscles or had repairs to the ischial tuberosity augmented.<sup>6</sup>

In keeping with this finding we had difficulty mobilising the tendon back to its origin 11 days following rupture due to the retraction and healing that had already taken place. This finding is in contrast to complete ruptures where delayed repair is possible but more technically demanding.<sup>2,4</sup>

The standard approach is below gluteus maximus. The advantages of this approach are that the sciatic nerve can be identified distally and protected as the hamstrings are followed proximally. We found that one problem of this approach is that retraction of the gluteus maximus superiorly in patients who have a well developed musculature, may be difficult with concomitant risks of a traction injury to the inferior gluteal nerve. To reduce this possibility in subsequent cases we would consider splitting gluteus maximus in the line of its fibres to obtain access onto the tear and ischial tuberosity and minimise the retraction needed. The posterior cutaneous nerve of the thigh is found during the approach and every care must be taken to protect it.

In conclusion, complete ruptures of the origin of the hamstrings are an uncommon injury but have been reported in the literature. By contrast, isolated ruptures of the origin on biceps femoris are less frequently reported. If a delay in diagnosis occurs then direct repair onto the ischial tuberosity is difficult. A high index of suspicion should be maintained in athletes presenting with "hamstring strains" and urgent imaging should be undertaken to confirm the diagnosis. We would advocate any surgical intervention within a few days of injury and that surgeons must be aware of the risk of iatrogenic nerve injury and consider a modification of the standard surgical approach to avoid such injury.

## References

1. Connell DA, Schneider-Kolsky ME, Hoving JL, Malara F, Buchbinder R, Koulouris G, et al. Longitudinal study comparing sonographic and MRI assessments of acute and healing hamstring injuries. *Am J Roentgenol* 2004;183(4):975–84.
2. Cross MJ, Vandersluis R, Wood D, Banff M. Surgical repair of chronic complete hamstring tendon rupture in the adult patient. *Am J Sports Med* 1998;26(6):785–8.
3. Garrett Jr WE, Rich FR, Nikolaou PK, Vogler III JB. Computed tomography of hamstring muscle strains. *Med Sci Sports Exerc* 1989;21(5):506–14.

4. Klingele KE, Sallay PI. Surgical repair of complete proximal hamstring tendon rupture. *Am J Sports Med* 2002;30(5):742–7.
5. Kwong Y, Patel J, Ramanathan EB. Spontaneous complete hamstring avulsion causing posterior thigh compartment syndrome. *Br J Sports Med* 2006;40(8):723–4.
6. Orava S, Kujala UM. Rupture of the ischial origin of the hamstring muscles. *Am J Sports Med* 1995;23(6):702–5.
7. Sallay PI, Friedman RL, Coogan PG, Garrett WE. Hamstring muscle injuries among water skiers. Functional outcome and prevention. *Am J Sports Med* 1996;24(2):130–6.
8. Servant CT, Jones CB. Displaced avulsion of the ischial apophysis: a hamstring injury requiring internal fixation. *Br J Sports Med* 1998;32(3):255–7.