Snapping Biceps Femoris: Clinical Demonstration and Operative Technique

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ABSTRACT

Snapping biceps femoris syndrome has been reported in the literature in a handful of case reports but not yet with a demonstration of clinical examination and intraoperative findings. We present an educational clinical video of snapping biceps femoris with intraoperative demonstration of findings and surgical repair.

KEYWORDS

Biceps femoris tendon – Snapping knee – Clinical examination – Surgical reconstruction

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Introduction

The biceps femoris muscle inserts on the fibular head but also has attachments to the iliotibial band, Gerdy's tubercle, the lateral collateral ligament and the posterolateral capsule. Recent clinical and cadaveric studies have demonstrated the complexity of biceps femoris tendon insertion, showing it has both medial and lateral slips (each with an anterior and posterior component) as well as attachments into the lateral condyle of the femur, the popliteus tendon and the arcuate popliteal ligament.^{1–5} This may explain the important role of the biceps femoris tendon in adding dynamic stability to the posterolateral corner by means of its numerous attachment sites.

Biceps femoris snapping syndrome has been described in the literature (mostly in case reports) as causing lateral knee pain and snapping, which have been treated with a variety of techniques including anatomical repair and reconstruction.^{4–10} We present a clinical video of snapping biceps femoris syndrome with intraoperative demonstration of findings and surgical repair.

Case history

We describe the case of a 49-year-old engineer who presented with ongoing lateral knee pain and clicking, which had been present for many years. These symptoms had failed to improve on conservative measures with analgesia, prolonged physiotherapy and activity modification. The symptoms were exacerbated when performing knee flexion activities, ascending stairs and cycling. He had full range of movement in his knee, with no joint line tenderness. He was able to elicit visible subluxation of the biceps femoris tendon in deep knee flexion, which could also be elicited passively

(video available online as supplementary material). Subsequent plain radiography (Fig 1) and magnetic resonance imaging (Fig 2) were unremarkable. The patient underwent surgical anatomical repair with complete resolution of symptoms and returned to full activities at three months following surgery. He was discharged at the 12-month review appointment.

Surgical technique

The patient was positioned supine with a side post and footrest. A posterolateral approach was employed¹¹ with the incision centred over the biceps femoris tendon (Fig 3, video).

Subcutaneous dissection was continued to the fascia, allowing identification of the interval between the iliotibial

Figure 1 Plain anteroposterior and lateral radiography of the knee

Figure 2 T2 weighted sagittal and axial magnetic resonance imaging of the knee with unremarkable appearance of the biceps femoris tendon

Figure 3 Clinical photographs of intraoperative findings and surgical repair. Please also see video demonstration (available online as supplementary material) of successful repair during range of motion. A) The common peroneal nerve identified and protected with a nerve sloop. B) Partial anterior attachment of biceps femoris tendon with a sleeve of tendinous tissue that appeared to have lifted off its usual broad attachment site. C and D) Following anatomical repair, two suture anchors were introduced into the bare area to snug down the tendinous tissue and recreate the normal anatomical footprint.

band and biceps femoris. This interval was developed to define the attachment of the biceps to the head of the fibula. The common peroneal nerve was identified posterior to the biceps tendon and marked with a sloop. Examination of the tendon insertion demonstrated that rather than finding a broad anterolateral attachment to the fibular head, there were only some anterior attachments, leaving a sleeve of tendinous tissue that appeared to have lifted off its usual broad attachment site (Fig 4a). By retracting this sleeve of tendon anteriorly, a bare area was created anterolaterally using diathermy and a curette. Two suture anchors were introduced into this area; these were used to snug down the tendinous

tissue and recreate the normal anatomical footprint (Fig 4b). The wound was closed in layers with absorbable sutures.

Postoperatively, a hinged knee brace was applied for use when weight bearing, to restrict knee flexion to no more than 90° in the first six weeks. At six weeks, the precautions were lifted and the patient was encouraged to flex his knee without restriction. Further review at 12 months confirmed that he could actively achieve full range of motion, pain free and with ease, and there were no more symptoms or signs of tendon subluxation or snapping.

Figure 4 Schematic representation of intraoperative findings. A) Abnormal insertion of biceps femoris tendon with only small sleeve of tendinous insertion. B) Anatomical insertion achieved anterolaterally on the fibula head using two suture anchors.

Discussion

Our understanding of lateral knee pain and the posterolateral corner continues to evolve. A quantitative analysis of distal insertions of the biceps femoris in 2015 identified tibial, distal fibular, medial fibular and proximal fibular footprints as consistent components of the insertion of the biceps femoris.¹²

While snapping biceps femoris syndrome is a recognised entity in the literature, it remains an uncommon cause of lateral knee pain with only few case reports and small series published, leaving treating clinicians with little evidence to guide their management.^{4–10,13–17} Most, however, agree on the need for surgical intervention once all non-operative measures have failed to relieve the painful symptomatic snapping. Plain radiography, magnetic resonance imaging and diagnostic arthroscopy have all been used to guide management and eliminate other pathologies. A variety of surgical techniques have been reported in those cases, using either anatomical repair methods, rerouting of the tendon through osseous tunnels or partial resection of the involved tendon. Most have reported good outcomes with resolution of symptoms.

In managing our patient, all conservative measures were also exhausted and he elected to undergo surgical repair. Our intraoperative findings demonstrated subluxation of the biceps femoris tendon (video). Once repair had been undertaken, the tendon was stabilised in deep flexion, which translated postoperatively to resolution of the painful snapping.

Conclusions

Snapping biceps femoris syndrome is an uncommon cause of lateral knee pain and snapping. Surgical intervention

may be necessary if all non-operative measures have failed to relieve symptoms.

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