

Case Report

Common peroneal nerve palsy as a postoperative complication in lateral meniscus repair

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ABSTRACT

Arthroscopic lateral meniscus repair using an inside-out technique can potentially be hazardous to the common peroneal nerve. This is true even for a longitudinal incision posterior to the posterior border of the iliotibial band, which allows visualization of the lateral joint capsule. A 37-year-old woman presented with common peroneal nerve dysfunction after an arthroscopic lateral meniscus repair using this technique. After confirmation of nerve entrapment by magnetic resonance imaging (MRI), an early exploration to decompress the involved nerve eventually resulted in the recovery of neurological function. In addition, an all-inside technique using a FasT-Fix suture device was used as an effective and safe remedy after untying the earlier sutures from the lateral meniscus repair that were trapping the nerve.

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1. Introduction

The two most important functions of the menisci are load transmission across the knee joint and supporting the stability of the knee joint.^{1–5} Furthermore, the development of the concept of a vascular gradient within the substance of menisci has supported the healing potential of menisci, especially in the outer third region.^{6–8} As a consequence, attempts to preserve and repair a meniscus are now widely accepted as a viable treatment strategy for meniscus tears. Both open repair and arthroscopic repair techniques have been found to be effective approaches to meniscal suturing.² Although the arthroscopic-assisted technique is less invasive and allows easier suture placement because of direct visualization compared with open repair, a number of arthroscopic surgeons have expressed concerns about the risk of violating neurovascular structures around the knee when placing sutures.^{1–3,9,10}

The structures subject to injury on the medial side are primarily the saphenous vein and nerve. Injury to these structures may cause pain and numbness. However, on the lateral side, the common peroneal nerve is at greatest risk and if injured, the results can be devastating.³ A number of different arthroscopic techniques have been designed to prevent these complications, including the

outside-in and all-inside techniques. Using all-inside meniscal repair devices, selected types of the torn meniscus can be sutured in the joint throughout the whole procedure and this can considerably diminish the risk of damage to any neurovascular structures that are at risk.⁹

In this article, we present a case of lateral meniscus repair using the inside-out technique that was complicated by common peroneal nerve palsy. Postoperative magnetic resonance imaging (MRI) confirmed entrapment of the common peroneal nerve by sutures. A salvage procedure was carried out that included releasing the sutures and repairing the torn meniscus using an all-inside technique.

2. Case report

A 37-year-old woman had injured her right knee in a fall about 3 months before hospitalization. She presented at our hospital with persistent pain during ambulation. On clinical examination, tenderness over the lateral aspect of her right knee joint was noted and the McMurray test indicated a suspicion of a lateral meniscus tear. Results of an MRI of the involved knee revealed a tear of the posterior horn of the lateral meniscus and this was confirmed as the clinical diagnosis (Fig. 1). As a result, she was admitted for arthroscopic knee surgery. During the operation, the knee was placed in the figure-four position, and a longitudinal, 10-mm tear in the outer third of the posterior horn of the lateral meniscus was

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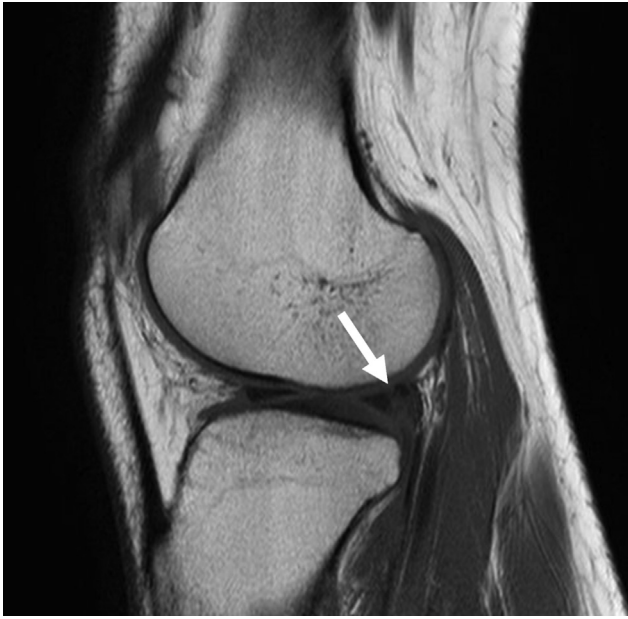


Fig. 1. Preoperative axial T1-weighted magnetic resonance imaging of the patient's right knee reveals a tear (arrow) in the posterior horn of the lateral meniscus.

identified directly by arthroscopy. This tear was considered to have enough healing potential for repair. We created a 5-cm ancillary posterior incision over the posterolateral aspect of the knee between the posterior border of the iliotibial band and the biceps femoris tendon together with deep blunt dissection for direct visualization of the needle exits. We then repaired the torn part of the lateral meniscus with sutures using the inside-out method. We also utilized a retractor to protect the neurovascular structures during suturing. We used a double-lumen sleeve (Smith & Nephew) with a selected angle to facilitate the needle approach. The repair was made in a vertical pattern and the sutures (Maxon, monofilament absorbable suture) were placed on either side of the torn site with two knots tightened outside over the joint capsule. Nevertheless, she had pain and numbness on the anterior aspect of her right calf and the dorsum of the right foot shortly after surgery and this was accompanied by ipsilateral foot drop. Common peroneal nerve palsy was suspected. The MRI of the involved knee was repeated and this revealed common peroneal nerve entrapment between the sutures (Fig. 2). With the patient's agreement, we performed a follow-up surgery on the 4th day after the initial procedure to eliminate this complication. During the second surgery, we explored the original posterior incision. First, the sutures were removed, followed by the identification of the compressed nerve. Subsequently, the torn lateral meniscus was repaired arthroscopically by the all-inside technique using a commercial device (Fast-Fix, Smith & Nephew) (Fig. 3). Postoperative rehabilitation included nonweight bearing exercises for the first 4 weeks with a knee brace restricting knee motion and ankle-foot orthosis to maintain the ankle joint in a neutral position. The patient progressed well and showed initial improvement in her subjective sensation over the dorsum of the ipsilateral foot within 2 weeks postoperatively. At 6 weeks postoperatively, she underwent a partial weight-bearing rehabilitation program without pain or soreness involving her right knee. At 4 months postoperatively, she had recovered normal sensory function throughout the common peroneal nerve distribution. Nevertheless, it took another 2 months before there was a complete return of motor strength of ankle dorsiflexion in the affected limb.

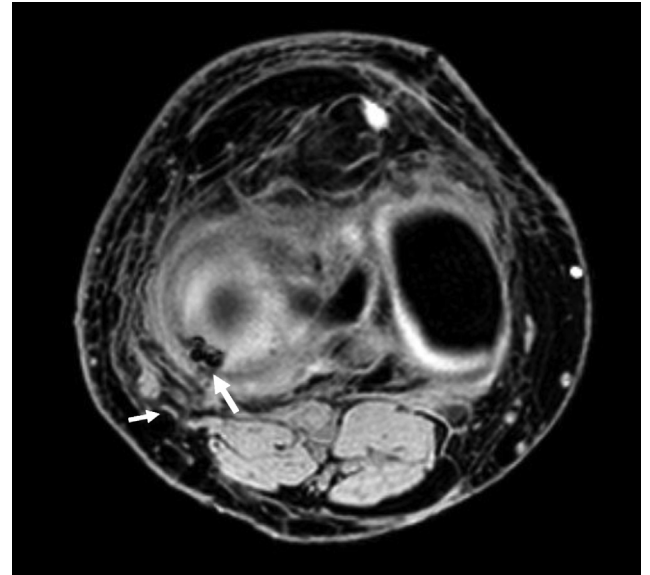


Fig. 2. Axial magnetic resonance imaging of the patient's right knee after the initial repair procedures reveal that the common peroneal nerve (small arrow, medium signal) is entrapped by the sutures (large arrow).

3. Discussion

Since Charles Henning first used this technique in 1980,¹¹ the inside-out procedure has generally been accepted as the gold standard for arthroscopic meniscal repair. One disadvantage of the inside-out method is that it involves an inherent risk to the surrounding neurovascular structures. Jurist et al applied computerized axial tomography in a cadaver study. After injecting radiopaque contrast medium mixed with methylene blue into the nerve sheath, they identified the course of needles used during lateral meniscal repair and their proximity to neurovascular structures. They reported that even though the inside-out technique allows exact placement of the sutures by direct visualization through the arthroscope, the exit point of the needle is highly

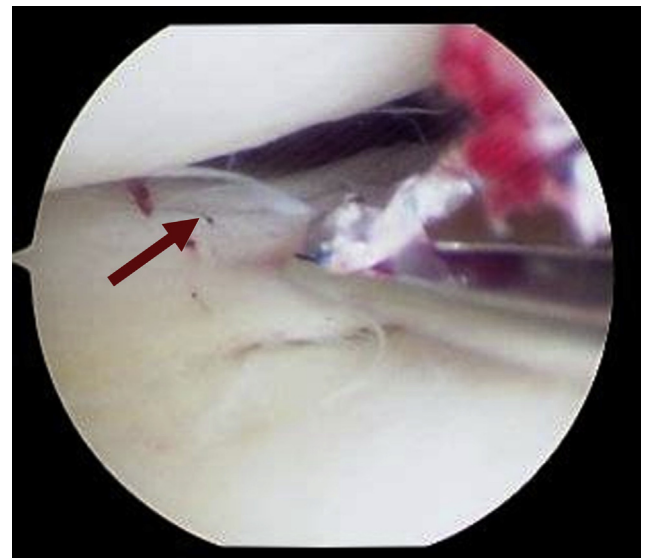


Fig. 3. Arthroscopic picture showing the lateral meniscus repair using the all-inside technique and a Fast-Fix suture device (arrow points to the site of the lateral meniscus tear).

unpredictable and can be hazardous.³ They concluded that needles placed outside-in are significantly further from the nerve than those placed inside-out. The common peroneal nerve is encased in a pad of fat and lies just behind the tendon of the lateral gastrocnemius at the level of the joint and meniscus. Therefore, they suggested that the inside-out method can be performed safely when there is insertion of a retractor in front of the lateral gastrocnemius with the knee at 90°; furthermore, this must be maintained during passage, retrieval, and tying of all sutures. In the initial repair procedure in our case, we failed to protect the common peroneal nerve with a retractor continuously, which was removed and replaced repeatedly during passage and retrieval of the needles. The nerve presumably came to lie in front of the retractor during one of these passes of the retractor, and was entrapped when the suture was being tied (Fig. 2). We strongly suggest that every effort should be made to hold the retractor steady in front of the lateral gastrocnemius during this type of operation in order to avoid trapping of the peroneal nerve during placement of the sutures, and to allow tying of the knot directly over the joint capsule.

Both the outside-in and all-inside methods can be used for lateral meniscus repair and their use depends on the circumstances. In our salvage procedures, we adopted an all-inside technique for the lateral meniscus repair. This was primarily carried out to prevent the injured nerve from being further stretched by the retractor. In addition, it is difficult to approach the posterior part of the lateral meniscus using the outside-in method. We used an all-inside device, Fast-Fix, which is designed with two T-Fix 5-mm polymer suture bar anchors attached to No. 0 nonabsorbable, braided polyester. The Fast-Fix suture device is able to facilitate all-inside suturing, allowing a choice of vertical, horizontal, or oblique patterns depending on the anatomy of the tear; this method approaches the strength of the inside-out technique.⁹ In addition, there is no need to utilize a retractor during this procedure to secure neurovascular integrity.

We have found only a few reported cases in the literature describing compromise of the common peroneal nerve during lateral meniscus repair due to entrapment by sutures. In the two reports published more than 20 years ago, the sutures were removed within 5 days of the initial procedure. Subsequently, the motor and sensory functions of the common peroneal nerve returned to normal in both patients at 6 months postoperatively, which is similar to our case.^{3,10} However, they did not mention how they managed the torn lateral menisci after releasing the sutures. Healing of the menisci in those two cases could not possibly have occurred in less than a week. The all-inside device, as was demonstrated in our case, is able to solve this problem without further negative effects on the injured nerve structures. In one other case reported by Anderson and LaPrade, late surgery was carried out 7 months after the initial procedure. Nevertheless, that patient's sensory function and motor strength returned to normal 4 months postoperatively. Despite the delay in intervention, the authors of this paper still emphasized the importance of immediate re-exploration to ensure a good outcome.¹

Many postoperative nerve injuries are neurapraxias that recover with time and are mostly caused by stretch injuries during surgery. As a result, conservative treatment is currently recommended initially, including rest, analgesic medication, orthotics, and physical therapy. If the symptoms persist for 2–3 months without improvement, then surgical intervention should be considered.^{12,13} However, previous reports have suggested that early surgical re-

exploration is important in order to obviate possible predisposing factors when there is a compromise of the common peroneal nerve.^{1,3,10} In our case, the complications from common peroneal palsy occurred shortly after the initial repair surgery, which was frustrating to both the patient and the surgeon. They also raised concerns about nerve entrapment by the sutures. Previous studies have advocated MRI for the evaluation of peripheral neuropathy to allow direct visualization of the nerves, identification of the cause of nerve injury, and its exact site.^{14,15} The MRI in our patient showed that the sutures were trapping the common peroneal nerve. In other words, the nerve was being compressed continuously. To prevent further damage to the nerve, we decided to untie the sutures and then repair the torn lateral meniscus using the all-inside method. About 6 months later, the patient showed full return of the neurological functioning of the common peroneal nerve as well as full symptom relief of the involved knee.

4. Conclusion

Although the arthroscopic inside-out method for the repair of torn menisci is a generally acceptable treatment, it must be applied with caution. The best policy for controlling common peroneal nerve injuries is prevention. Precautions should include the insertion of a retractor in front of the lateral gastrocnemius to prevent entrapment or injury when passing the needles through; alternatively, the outside-in or the all-inside technique should be used. If common peroneal nerve palsy occurs, the cause and pathological site should be confirmed by MRI of the knee, as was done in our case. In this context, early exploration to carry out decompression with the addition of an all-inside lateral meniscal repair appears to be a safe and effective strategy when treating this complication.

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