

Suture Tape Augmentation Repair of the Medial Patellofemoral Ligament



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Abstract: Adolescents with osteochondral loose bodies after a first-time patellar dislocation are most commonly treated with surgical intervention. However, the ideal method of managing a concurrent medial patellofemoral ligament (MPFL) disruption is still unknown. Recent evidence suggests high failure rates are associated with primary MPFL repair. The purpose of this Technical Note is to describe an alternative surgical technique for managing acute first-time patellar dislocations by using high-strength suture augmentation of the MPFL.

Introduction

Patellar dislocations are frequent knee injuries in the pediatric and adolescent population, with an incidence of up to 108 per 100,000 persons in high-risk populations.¹ After the first dislocation, the medial patellofemoral ligament (MPFL) is torn in up to 90% of patients.² Recurrent dislocations occur in 17% to 69% of patients after the primary dislocation event.^{1,3,4} In patients with an acute hemarthrosis after a patellar dislocation, concurrent intra-articular injuries are common, with 94% of patients having chondral injuries and 72% having osteochondral injuries.⁵

In patients without intra-articular injury, the mainstay of treatment consists of physical therapy and bracing. However, in patients with intra-articular pathology (loose bodies, osteochondral injuries, meniscus tears), surgical management is warranted. In

these situations, many surgical techniques are available to address the MPFL tear, which may include repairs or reconstructions with or without tendon allografts, autografts, or suture augmentation. The purpose of this Technical Note is to describe a new surgical technique for managing acute first-time patellar dislocations using high-strength suture augmentation of the MPFL.

Surgical Technique

Indications

Indications for surgery include children and adolescents who have sustained a first-time patellar dislocation and have concurrent intra-articular pathology or do not wish to pursue nonoperative treatment.

Preoperative Preparation and Positioning

Patients are positioned supine on a standard radio-lucent operating table and induced under general anesthesia with laryngeal mask airway or endotracheal intubation. A preoperative examination is performed of the operative extremity, and the stability of the patella is noted. A nonsterile tourniquet is placed on the thigh, and the operative extremity is draped free. Standard preoperative prophylactic antibiotics are administered intravenously. The surgical technique is illustrated in [Video 1](#). Advantages and disadvantages of this technique as well as pearls and pitfalls are detailed in [Tables 1](#) and [2](#), respectively.

Arthroscopic Evaluation

Standard arthroscopic examination of the knee is performed. Any intra-articular pathology is addressed before proceeding to the MPFL repair.

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Table 1. Advantages and Disadvantages of Performing Medial Patellofemoral Ligament (MPFL) Augmentation With High-Strength Suture Tape

Advantages	Disadvantages
Quick procedure	Cost of implants (suture anchors) compared with primary repair
No need for tendon autograft/allograft	No direct repair of the MPFL
Reduced morbidity and risk for disease transmission compared with reconstruction	Because of the fixed length of the tape, the procedure is not applicable to the growing child
Can often use same incision as for osteochondral lesion fixation	
Socket creation and small suture anchors minimize risk of patellar fracture	

Approach

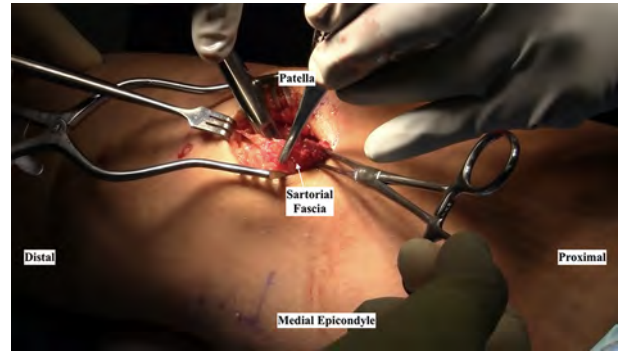
Anatomic landmarks are marked out, including the patella and medial epicondyle with the knee in extension. A 4-cm longitudinal incision is made medial to the patella. A combination of sharp and blunt dissection is used to expose layer 2 of the medial side of the knee in an extracapsular fashion. Flaps of layer 2 are developed for future imbrication during closure (Fig 1). In cases of a concomitant osteochondral fracture, the medial capsule is opened, and the osteochondral fracture is reduced and fixated with bioabsorbable implants, per surgeon preference.

Patellar Preparation and Fixation

The medial cortex of the patella is prepped and decorticated with a rongeur. A guide pin is inserted into the patella at the junction between its middle and superior third (Fig 2). The guide pin is then overdrilled followed by placement of an absorbable 3.5-mm suture anchor (SwiveLock; Arthrex, Naples, FL) into the

Table 2. Pearls and Pitfalls of Performing Medial Patellofemoral Ligament (MPFL) Augmentation With High-Strength Suture Tape

Pearls	Pitfalls
Placing a hemostat from the anterior incision through layer 2 to the posterior incision makes identifying the correct layer to pass the repair easier.	Failure to develop layer 2 can lead to intra-articular placement of the repair.
When tensioning the suture tape, place a hemostat underneath to prevent overtightening.	Failing to use fluoroscopy to confirm the location of the femoral suture anchor at Schottle's point can lead to altered biomechanics.
When closing the medial tissues, check the patellar tracking to prevent overconstraining and maltracking.	

**Fig 1.** Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. A longitudinal incision is made in the medial retinaculum approximately 2 cm from the patella, which will be used for imbrication during the closure.

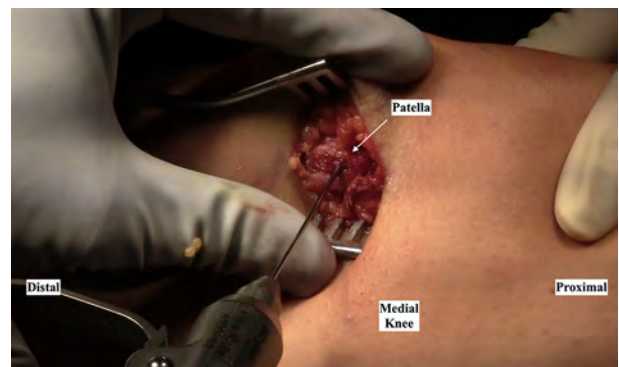
superomedial aspect of the patella affixed with the braided ultrahigh-molecular-weight polyethylene/polyester suture tape (FiberTape; Arthrex) (Fig 3).

Femoral Fixation

With the knee at 30° of flexion, the suture tape is shuttled through layer 2 using a 1- to 2-cm incision centered at the region of the medial epicondyle of the knee (Fig 4). The suture tape is then affixed to the femoral side at the anatomic femoral insertion as described by Schöttle et al.⁶ with an absorbable 4.75-mm suture anchor (SwiveLock; Arthrex) (Fig 5).

Tensioning

The intention of the MPFL suture augmentation is to act like an InternalBrace (Arthrex), creating a medial check-rein to lateral patella glide to prevent future subluxations/dislocations of the patella. Attention is paid to not overconstrain the patella. This will theoretically allow the native MPFL to heal. To prevent overtightening the suture, a curved hemostat is placed

**Fig 2.** Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. With the patella exposed, a guidewire is placed at the junction between the middle and superior third.

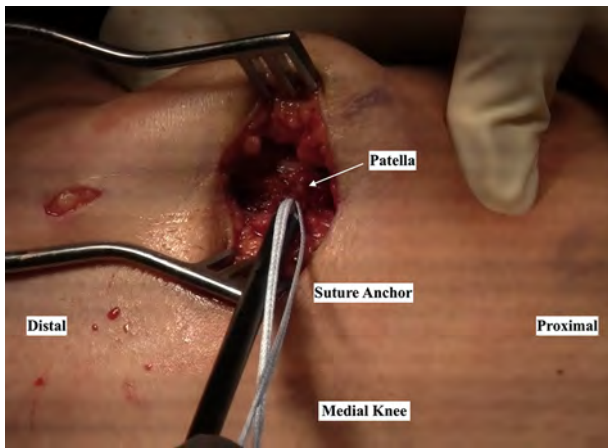


Fig 3. Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. The previously placed guide wire is overdrilled and a 3.5-mm absorbable suture anchor (SwiveLock; Arthrex, Naples, FL) is placed affixed with a 2-mm braided ultrahigh-molecular-weight polyethylene/polyester suture tape (FiberTape; Arthrex).

under the tape before final fixation and the patella is held with its lateral border aligned to the lateral aspect of the femoral trochlea (Fig 6), The repair is then visualized directly and arthroscopically to confirm the extra-articular position of the suture tape.

Closure

The previously created medial flaps of layer 2 are then imbricated by advancing the medial tissues laterally and distally approximately 5- to 10 mm with a No. 1 coated polyglactin suture placed in a horizontal mattress fashion. A layered monofilament subcutaneous closure is performed in standard fashion.

Postoperative Management

Postoperatively, patients are placed into a range-of-motion brace and allowed to weightbear as tolerated

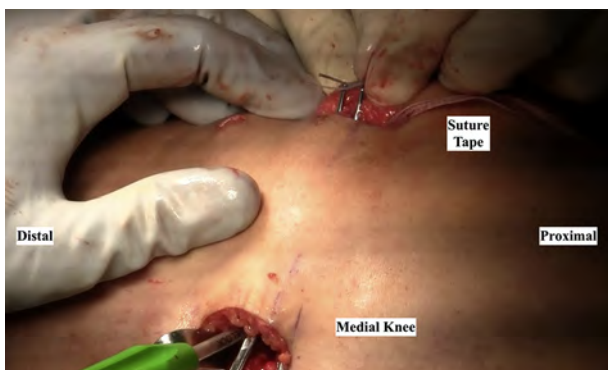


Fig 4. Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. A curved hemostat is placed through layer 2 from the femoral to patellar incision and the suture from the previously placed suture anchor is brought through the femoral incision.

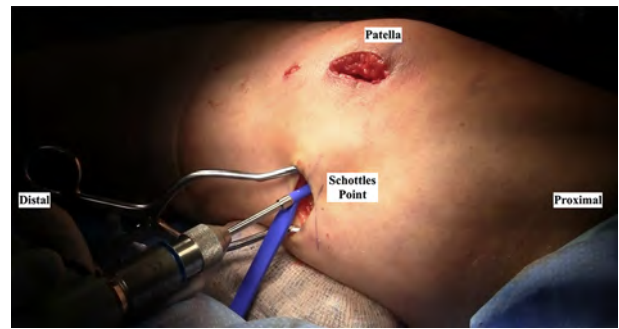


Fig 5. Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. A drill is placed over Schottle's point and confirmed fluoroscopically. The femoral tunnel is drilled to approximately 25 mm and tapped.

with the brace locked in full knee extension. A continuous passive motion machine is used at home approximately 6 hours daily, starting at 0° to 30° and progressing as tolerated to reach at least 90° of knee flexion by postoperative day 21. Standard physical therapy commences at no greater than 10 to 14 days postoperatively. The brace is incrementally unlocked starting at postoperative week 4 with 0° to 30° and is increased as quadriceps control returns. The brace is completely unlocked by week 6 to week 8. The brace is discontinued once full active extension is achieved and the patient demonstrates no extension lag with a supine straight leg raise. Patients are allowed to return to their sport at 4 to 6 months.

Discussion

Adolescents with osteochondral loose bodies after a first-time patellar dislocation are most commonly treated with surgical intervention. However, the ideal method of managing a concurrent MPFL tear is still unknown. Traditionally, the MPFL has been treated with benign neglect or primary repair, but recent

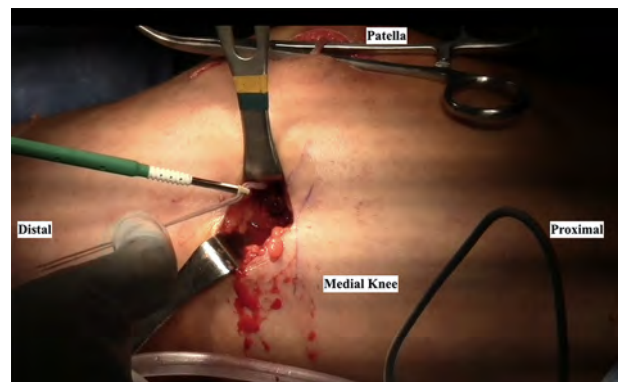


Fig 6. Intraoperative photograph of a right knee as viewed from the medial side. The left of the photograph is distal, and the right is proximal. The suture tape is brought through the eyelets of a 4.75-mm knotless suture anchor (SwiveLock; Arthrex, Naples, FL) and secured.

studies have called into question the efficacy of these treatment strategies. Pedowitz et al.⁷ performed a retrospective review of 41 adolescents who had undergone surgery for a osteochondral loose body. Sixteen of the adolescents underwent primary repair of the MPFL during the index operation for osteochondral loose body.⁷ Sixty-one percent of adolescents had recurrent instability and 39% required a secondary operation.⁷ Those who underwent primary repair of the MPFL did not have a reduction in recurrence, and the authors concluded that an alternative surgical procedure should be considered at the index operation.⁷

Conclusion

The technique described in this Technical Note provides an alternative technique to both primary MPFL repair and reconstruction in this patient population. We believe, by using suture augmentation as an InternalBrace check-rein against lateral patellar translation, the MPFL may have a better chance of healing primarily and repair of any concomitant cartilage lesions is protected from additional instability episodes after surgery. Additionally, the MPFL augmentation repair can be performed quickly in a minimally invasive manner and without the need for tendon autograft or allograft, ultimately reducing the morbidity and cost compared with a reconstruction.

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