

# Arthroscopic Repair of Acute Traumatic Medial Patellofemoral Ligament Tears at the Patellar Insertion



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**Abstract:** After a lateral patellar dislocation or subluxation, injury to the medial patellofemoral ligament (MPFL) is common. The MPFL originates between the medial epicondyle and the adductor tubercle, inserting along the superior one-third border of the medial patella. Operative treatment becomes necessary for patients with intra-articular pathology (such as osteochondral injuries or meniscus tears) or those experiencing recurrent dislocations. Numerous surgical techniques have been proposed for addressing this issue, with MPFL reconstruction being the most frequently performed procedure. Nonetheless, various complications associated with reconstruction have been documented. In recent years, there has been a growing interest in MPFL repair, which has shown acceptable outcomes in the literature. In this study, we introduce an arthroscopic-assisted MPFL repair technique designed for acute traumatic MPFL tears originating from the patellar insertion. This approach offers the advantage of being minimally invasive, straightforward, and reproducible.

The medial patellofemoral ligament (MPFL) is the primary restraining force against lateral patellar dislocation.<sup>1,2</sup> The MPFL is ruptured in up to 90% of patients at the first-time patellar dislocation.<sup>2</sup> It originates between the medial epicondyle and the adductor tubercle and inserts along the medial patella's superior one-third border.<sup>2,3</sup> Recurrent dislocation and osteochondral injuries are the most frequent consequences following lateral patellar dislocation.<sup>2,4</sup> Conservative treatment is the mainstay of treatment in patients with first-time

dislocation who do not have intra-articular pathology. However, operative treatment is required in patients with intra-articular pathology (osteochondral injuries or meniscus tears) or recurrent dislocation. Many surgical procedures are available in these instances to address the MPFL tear, which may include repairs,<sup>5,6</sup> plication,<sup>7</sup> and reconstructions.<sup>8-10</sup> MPFL reconstruction procedures, which restore the tightness of the medial patellar soft tissues with the tendon graft, are the most often performed surgical option for treating MPFL pathology.<sup>11,12</sup> However, several complications of reconstruction have been examined.<sup>13</sup> Recently, there has been increased interest in MPFL repair with acceptable outcomes in the literature.<sup>14</sup> In this article, we present an arthroscopic-assisted MPFL repair in acute traumatic MPFL tears from patellar insertion.

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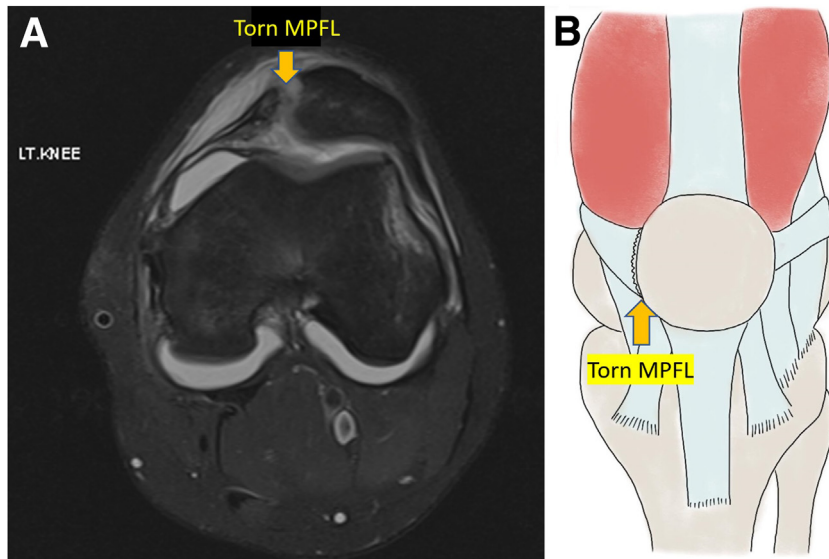
## Preoperative Evaluation

Magnetic resonance imaging is performed to identify the location of the MPFL tear and associated injuries (Fig 1, Video 1).

## Surgical Technique (With Video Illustration)

### Patient Positioning

The patient is lying supine with the surgeon sitting ipsilaterally. After administering spinal anesthesia, an



**Fig 1.** (A) Axial T2 weighted magnetic resonance imaging of the left knee showing a patellar-sided medial patellofemoral ligament (MPFL) tear. (B) Left knee: illustration drawing showing a patellar-sided MPFL tear.

examination under anesthesia is performed to find any related ligament instability. A tourniquet is placed around the proximal thigh to control bleeding.

#### Arthroscopic Examination

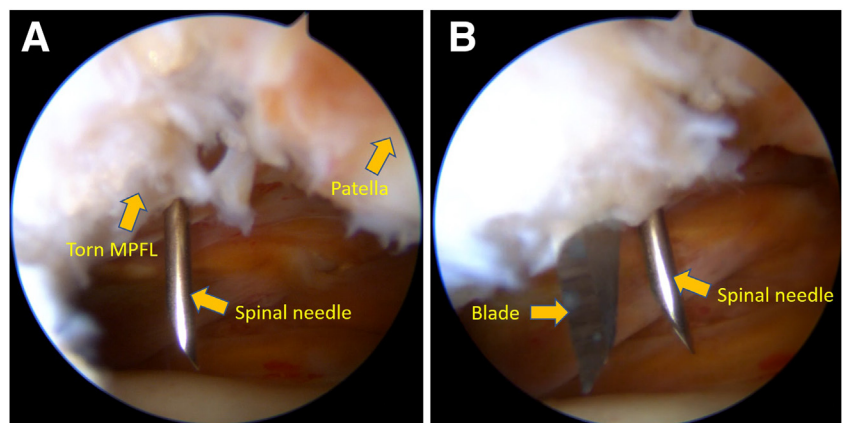
The first step is to insert the arthroscope through the anterolateral portal, which is located next to the patellar tendon and in the soft spot above the joint line. After that, a standard arthroscopic examination is carried out to assess the associated intra-articular lesions. The arthroscopic image allows for the detection of the torn MPFL. The location of a torn MPFL can be observed on the medial aspect of the patella (Fig 2A, Video 1). The spinal needle is inserted from the outside-in at the site of the torn MPFL. Subsequently, an

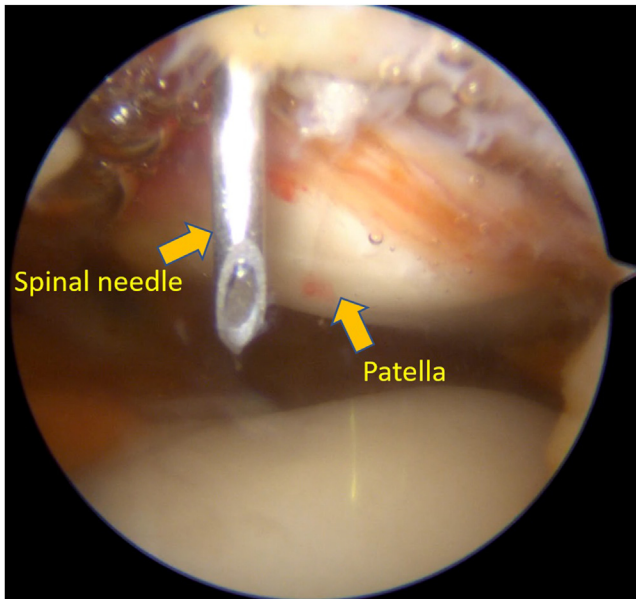
incision is made at the location where the spinal needle was inserted, and the blade is visualized in the arthroscopic view (Fig 2B, Video 1).

#### Anchor Suture Insertion

The arthroscope is then switched to the anteromedial portal. The location of the torn MPFL is identified by the spinal needle (Fig 3, Video 1). Subsequent to this, dissection is meticulously performed in the direction of the medial patellar edge. A drill sleeve is then meticulously positioned at the superomedial edge of the patella through the established incision (Fig 4A, Video 1). Following this, the double-loaded 1.8-mm Y-Knot All-Suture Anchor (CONMED) is predrilled and carefully inserted into the superomedial edge of the patella (Fig 4B, Video 1).

**Fig 2.** Left knee, supine position, viewing from the anterolateral portal. (A) The location of a torn medial patellofemoral ligament (MPFL) can be observed on the medial aspect of the patella. (B) A spinal needle is inserted from the outside-in at the location of the torn MPFL, followed by making an incision at the needle insertion point and finally visualizing the blade in the arthroscopic view.





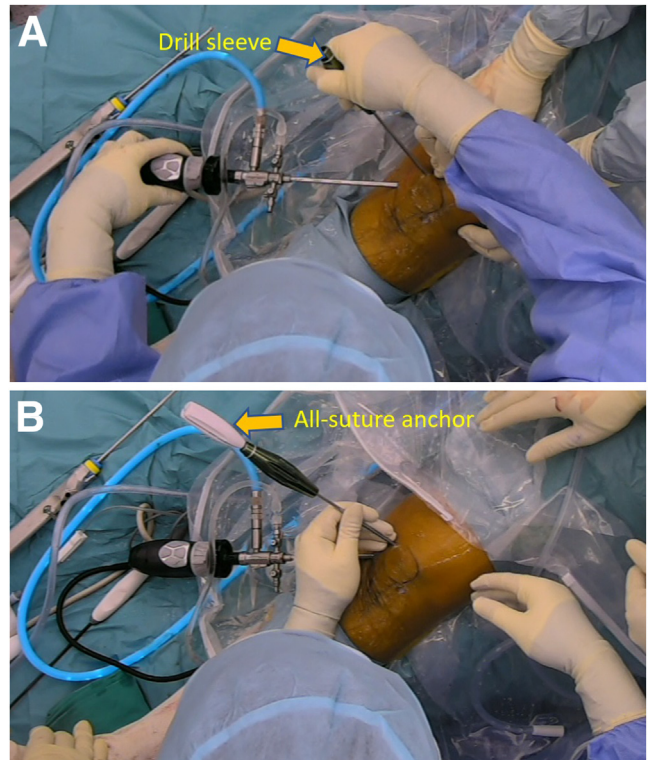
**Fig 3.** Left knee, supine position, viewing from the anteromedial portal. The location of the torn medial patellofemoral ligament is identified by the spinal needle.

### Sewing the MPFL

The mini FIRSTPASS suture passer (Smith & Nephew) is loaded with a No. 2 Hi-Fi suture (CONMED) from the suture anchor and subsequently inserted through the established incision (Fig 5A, Video 1). This suture passer is used to thread the suture through the torn MPFL (Fig 5B, Video 1). This process is then repeated to pass all 4 limbs of the No. 2 Hi-Fi sutures from the suture anchor through the MPFL. Finally, the knots are tied in a horizontal mattress fashion to complete the repair of the torn MPFL to the patella (Fig 6, Video 1).

### Postoperative Care

On the first day after surgery, we apply a hinged knee brace and lock it in full extension. Patients are permitted to walk with toe-touch weightbearing immediately after surgery for the first 2 weeks. After the second, fourth, and sixth postoperative weeks, range of motion is allowed for knee flexions of 30, 45, and 90 degrees, respectively. For weightbearing, patients are initially allowed to walk with 30% weightbearing at the second postoperative week, and they can gradually progress to full weightbearing at 4 to 6 weeks postoperatively. Quadriceps strengthening exercises are started 4 weeks following the surgery. Noncontact sports are permitted after 3 months, whereas contact sports are allowed at 6 months.



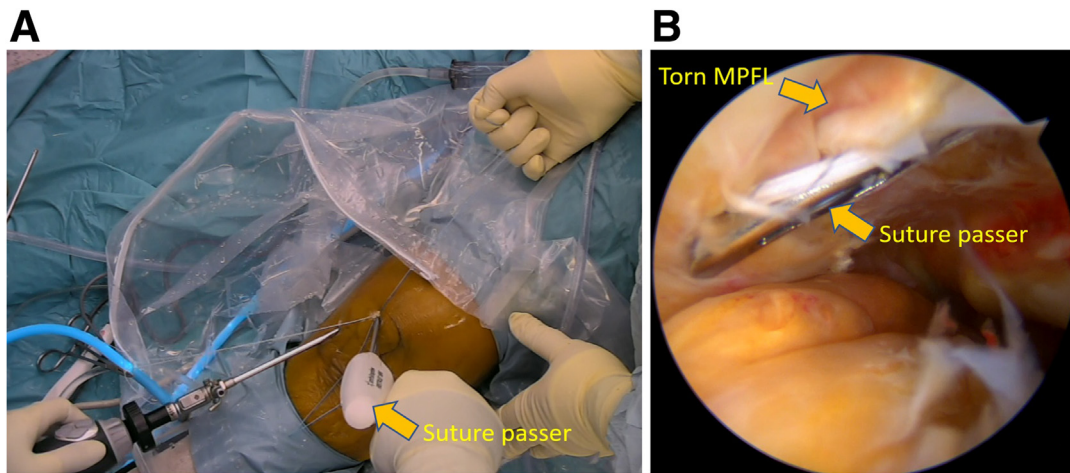
**Fig 4.** Left knee, supine position. (A) A drill sleeve is placed at the superomedial edge of the patella through the established incision. (B) The double-loaded 1.8-mm Y-Knot All-Suture Anchor (CONMED) is predrilled and carefully inserted into the superomedial edge of the patella.

### Discussion

MPFL reconstruction is the most frequently performed surgical option for addressing lateral patellar instability, yet the literature reports several associated complications.<sup>11-13</sup> MPFL repair is less common, but there has been growing interest in it in recent years.

The systematic review conducted by Shah et al.<sup>13</sup> demonstrated that MPFL reconstruction exhibits a high success rate in patients with patellofemoral instability. However, the review also revealed a complication rate of 26.1%, with 26 patients requiring additional surgery due to issues like femoral tunnel widening or MPFL overtightening.<sup>15,16</sup>

Dragoo et al.<sup>14</sup> conducted a cohort study comparing MPFL repair with reconstruction in patients with recurrent patellar instability. The study indicated that both MPFL repair and reconstruction can yield clinically satisfactory results at a 2-year follow-up. Following a first-time patellar dislocation, reconstruction may be considered unnecessary.

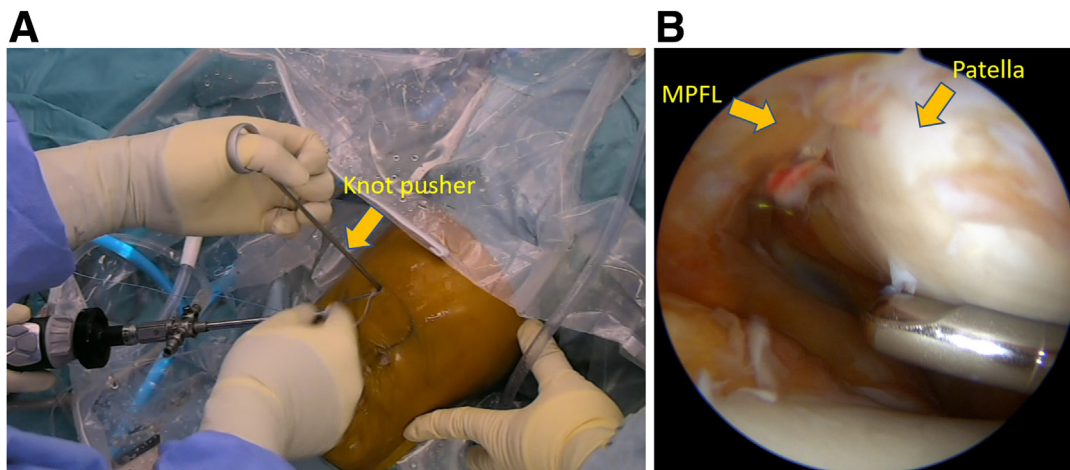


**Fig 5.** Left knee, supine position. (A) The FIRSTPASS Suture Passer is inserted through the established incision. (B) Viewing from anteromedial portal, the suture passer is used to pass the suture through the torn medial patellofemoral ligament (MPFL).

This technique may serve as a viable alternative for addressing lateral patellar instability, as it has evolved to become less invasive and more effective. One notable technique involves the restoration of the anatomic position of the medial patellofemoral ligament, achieved through direct visualization with an arthroscope. This procedure offers the advantage of adjustable tension repair, facilitating precise fine-tuning through knot tightening. What sets this method apart is its ability to eliminate the need for grafts, thereby reducing post-operative morbidity. Moreover, it presents a particularly safe option for skeletally immature patients as it carries no risk of growth plate injury. Overall, this technique is recognized for its simplicity and reproducibility, making it a valuable addition to the treatment of patellar instability.

In the surgical management of patellar instability, a systematic approach is crucial for achieving optimal

outcomes. This involves several key steps. First, using a spinal needle provides precise localization of the torn MPFL, allowing for accurate identification and assessment. Next, the anteromedial portal is employed, ensuring optimal visualization of the patellar anatomy and ligament. This step is critical for the subsequent procedures, ensuring that each action is carried out with the utmost precision. Additionally, to address potential challenges posed by smaller patellae, particularly in populations with a higher susceptibility to fractures, such as the Asian population, the use of an all-suture anchor is recommended. The all-suture anchor not only facilitates a secure ligament repair but also helps mitigate bone defects, reducing the risk of fractures in these cases. For a comprehensive overview of the procedure's advantages, disadvantages, and pearls, please refer to [Table 1](#).



**Fig 6.** Left knee, supine position. The knots are tied in the horizontal mattress fashion to repair the torn medial patellofemoral ligament (MPFL) to the patella. (B) Viewing from anteromedial portal, the torn MPFL is reattached to the patella.

**Table 1.** Advantages, Disadvantages, and Pearls of the Procedure

Advantages	<ul style="list-style-type: none"> <li>- Minimally invasive procedure.</li> <li>- Restoration of the anatomic position of the medial patellofemoral ligament through direct visualization with an arthroscope.</li> <li>- Adjustable tension repair achieved by knot tightening.</li> <li>- Eliminates the need for grafts, reducing morbidity.</li> <li>- No risk of growth plate injury in skeletally immature patients.</li> <li>- A straightforward and reproducible technique.</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Risk of recurrence compared to reconstruction.</li> </ul>
Pearls	<ul style="list-style-type: none"> <li>- Arthroscopy skills are required.</li> <li>- Using the spinal needle to precisely locate the torn medial patellofemoral ligament.</li> <li>- Employing the anteromedial portal to ensure optimal visualization.</li> <li>- Applying the all-suture anchor to mitigate bone defects in smaller patellae, which may be susceptible to fractures, especially in the Asian population.</li> </ul>

In conclusion, this technique is a less invasive, straightforward, and reproducible method for repairing the torn MPFL.

### Disclosure

The authors report no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as [supplementary material](#).

### References

1. Hopper GP, Leach WJ, Rooney BP, Walker CR, Blyth MJ. Does degree of trochlear dysplasia and position of femoral tunnel influence outcome after medial patellofemoral ligament reconstruction? *Am J Sports Med* 2014;42:716-722.
2. Petri M, Ettinger M, Stuebig T, et al. Current concepts for patellar dislocation. *Arch Trauma Res* 2015;4:e29301.
3. Trinh TQ, Ferrel JR, Bentley JC, Steensen RN. The anatomy of the medial patellofemoral ligament. *Orthopedics* 2017;40:e583-e588.
4. Lewallen LW, McIntosh AL, Dahm DL. Predictors of recurrent instability after acute patellofemoral dislocation in pediatric and adolescent patients. *Am J Sports Med* 2013;41:575-581.
5. Hopper GP, Heusdens CHW, Dossche L, Mackay GM. Medial patellofemoral ligament repair with suture tape augmentation. *Arthrosc Tech* 2019;8:e1-e5.
6. Yanasse RH, Aravechia G, Ramos TR, et al. Surgical technique: Anatomic medial patellofemoral ligament retensioning repair. *Arthrosc Tech* 2018;7:e569-e574.
7. Prasathaporn N, Kuptniratsaikul S, Kongrukreatiyos K. Arthroscopic medial retinacular plication with a needle-hole technique. *Arthrosc Tech* 2014;3:e483-486.
8. Ishibashi Y, Kimura Y, Sasaki E, Sasaki S, Yamamoto Y, Tsuda E. Medial patellofemoral ligament reconstruction using FiberTape and knotless SwiveLock anchors. *Arthrosc Tech* 2020;9:e1197-e1202.
9. Kay J, Memon M, Ayeni OR, Peterson D. Medial patellofemoral ligament reconstruction techniques and outcomes: A scoping review. *Curr Rev Musculoskelet Med* 2021;14:321-327.
10. Monllau JC, Erquicia JI, Ibañez M, et al. Reconstruction of the medial patellofemoral ligament. *Arthrosc Tech* 2017;6:e1471-e1476.
11. Camp CL, Krych AJ, Dahm DL, Levy BA, Stuart MJ. Medial patellofemoral ligament repair for recurrent patellar dislocation. *Am J Sports Med* 2010;38:2248-2254.
12. Mackay ND, Smith NA, Parsons N, Spalding T, Thompson P, Sprowson AP. Medial patellofemoral ligament reconstruction for patellar dislocation: A systematic review. *Orthop J Sports Med* 2014;2:2325967114544021.
13. Shah JN, Howard JS, Flanigan DC, Brophy RH, Carey JL, Lattermann C. A systematic review of complications and failures associated with medial patellofemoral ligament reconstruction for recurrent patellar dislocation. *Am J Sports Med* 2012;40:1916-1923.
14. Dragoo JL, Nguyen M, Gatewood CT, Taunton JD, Young S. Medial patellofemoral ligament repair versus reconstruction for recurrent patellar instability: Two-year results of an algorithm-based approach. *Orthop J Sports Med* 2017;5:2325967116689465.
15. Berard JB, Magnussen RA, Bonjean G, et al. Femoral tunnel enlargement after medial patellofemoral ligament reconstruction: Prevalence, risk factors, and clinical effect. *Am J Sports Med* 2014;42:297-301.
16. Thauunat M, Erasmus PJ. Management of overtight medial patellofemoral ligament reconstruction. *Knee Surg Sports Traumatol Arthrosc* 2009;17:480-483.