

Technical Note

Lateral Condyle Impaction Fracture Reduction With Anterior Cruciate Ligament Reconstruction, Medial Collateral Ligament Reconstruction, and Repair of Lateral Meniscus Radial Tear After a High-Grade Pivot-Shift Injury

Luke V. Tollefson, B.S., Evan P. Shoemaker, B.A., Nathan J. Jacobson, M.D., Erik L. Slette, M.D., and Robert F. LaPrade, M.D., Ph.D.

Abstract: The pivot shift is a common injury mechanism during an anterior cruciate ligament injury in which the tibia rotates anterolaterally with a combined valgus force. This mechanism can lead to bone bruising and even impaction fractures of the lateral femoral condyle. High-grade pivot-shift cases can also lead to pinching of the lateral meniscus, causing tearing. In cases with a sufficient valgus force, combined injuries, including the medial collateral ligament, can also occur. This video technique describes the reconstruction of the anterior cruciate ligament and medial collateral ligament, lateral meniscus radial tear repair, and reduction of a lateral femoral condyle impaction fracture caused by a high-grade pivot-shift injury.

One of the common injury mechanisms for an anterior cruciate ligament (ACL) tear is the pivot-shift mechanism, in which the tibia subluxes anterolaterally with a combined valgus force.¹ This pivot-shift mechanism can result in bone bruising of the lateral femoral condyle (LFC) and posterior tibial plateau, with impaction fractures potentially occurring in high-grade cases.¹⁻³ A previous study by Bernholt et al.² described these impaction fractures on magnetic resonance imaging (MRI) and reported that for patients with primary ACL tears, 25.9% of patients had LFC impaction fractures.

During the pivot-shift mechanism, a large enough valgus force, combined with the anterolateral subluxation of the tibia, can pinch the lateral meniscus and cause tearing.^{2,4} The valgus force can lead to combined

ACL and medial collateral ligament (MCL) tears, which are one of the most common injury patterns for multiligament knee injuries.⁵⁻⁷ In cases of high-grade MCL tears with significant medial compartment gapping, MCL reconstruction should be favored over nonoperative treatment.^{8,9} Additionally, radial tears should be repaired to mitigate the progression of osteoarthritis.^{10,11} In this Technical Note, we describe the surgical treatment for an ACL tear, an MCL tear, a lateral meniscus radial tear, and an LFC impaction fracture caused by a severe pivot-shift injury mechanism.

Surgical Technique

A detailed video of the ACL and MCL reconstruction, lateral meniscus radial repair, and LFC impaction fracture reduction technique is shown in [Video 1](#). The step-by-step guide and surgical pearls are in [Table 1](#).

Anesthesia and Positioning

The patient is positioned in the supine position and induced under general anesthesia. A knee examination is performed to validate clinical examination findings, including the Lachman, pivot-shift, and valgus stress examinations. A high thigh tourniquet is placed on the surgical leg. The surgical leg is placed in a leg holder

From Twin Cities Orthopedics, Edina, Minnesota, U.S.A.

Received February 14, 2025; accepted April 2, 2025.

Address correspondence to Robert F. LaPrade, M.D., Ph.D., Twin Cities Orthopedics, 4010 W 65th Street, Edina, MN 55435, U.S.A. E-mail: laprademdphd@gmail.com

© 2025 THE AUTHORS. Published by Elsevier Inc. on behalf of the Arthroscopy Association of North America. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2212-6287/25326

<https://doi.org/10.1016/j.eats.2025.103586>

Table 1. Step-by-Step Guide and Surgical Pearls for an Anatomic Reconstruction of the Anterior Cruciate Ligament and Medial Collateral Ligament Using Autografts

Step-by-Step Guide	Surgical Pearls
An anteromedial incision is made from the vastus medialis oblique muscle distally to 8 cm below the joint line.	Proper placement of this incision can facilitate performing the MCL and ACL reconstructions and graft harvests from the same incision.
A central third patellar tendon autograft is harvested: 10-mm × 20-mm patellar bone plug, 10-mm × 25-mm tibial bone plug.	The peritenon should be carefully dissected so it can be closed at the end of the case. Care should be taken to avoid going deeper than 1 cm on the patellar bone plug.
Gracilis and semitendinosus hamstring autografts are harvested and left attached distally.	The adhesions on the tendons should be removed with a Cobb elevator and Metzenbaum scissors to avoid amputation of the graft.
Distal tibial fixation of the MCL is performed with 2 Q-Fix (Smith & Nephew) suture anchors located 6 cm distal to the joint line at the native attachment of the MCL.	Care should be taken to avoid placing the Q-Fix anchors too anterior, and the anatomic tibial attachment should be re-created.
The adductor magnus tendon and adductor tubercle are identified; the medial epicondyle is 12 mm distal and 8 mm anterior to the adductor tubercle.	The MCL femoral attachment is just proximal and posterior to the medial epicondyle.
A beath pin is drilled through the anatomic attachment of the MCL on the femur and over-reamed with a 7-mm reamer.	This tunnel should be drilled to ensure the hamstring grafts do not bottom out, usually 35 to 40 mm deep.
The hamstring autografts are passed under the sartorial fascia, measured so 30 mm will go into the tunnel, and whipstitched together.	Once the grafts are whipstitched together, they can be cut. It is easier to whipstitch first, and then cut, rather than the other way around.
Medial and lateral parapatellar arthroscopic portals are made.	
The lateral femoral notch is cleared to identify the ACL attachment site, an accessory medial portal is made, a beath pin is drilled, and a 10-mm tunnel is drilled to a depth of 20 mm.	A 2-mm back wall should be maintained when drilling the femoral tunnel.
Both menisci should be evaluated for tears, and the impaction fracture should be visualized.	A proper arthroscopic evaluation is critical to evaluate the menisci to avoid missing any tears, especially ramp tears in the setting of an ACL tear.
The lateral incision for the inside-out radial repair is created. A spoon is inserted above the gastrocnemius and biceps tendons and posterior to the lateral capsule.	A probe or transillumination from the light from the scope camera can be used to determine the optimal location for the lateral incision.
Two vertical mattress sutures are placed on either side of the radial tear, followed by 3 to 4 horizontal mattress sutures.	The vertical mattress sutures act as rip-stops for the horizontal mattress sutures. The edges of the tears should be approximated to facilitate healing.
The ACL tibial tunnel location is then identified, a guide pin is drilled, and a full-length 10-mm tunnel is drilled.	The ACL tibial attachment is in line with the anterior root attachment of the lateral meniscus.
The ACL graft is fixed in the femur with a 7-mm × 20-mm titanium screw.	The screw should be located at the anterior aspect of the tunnel to avoid potentially breaking out the back wall.
A lateral parapatellar arthrotomy is created to visualize the lateral femoral condyle impaction fracture.	Proper visualization is important to ensure proper restoration of lateral femoral condyle curvature.
A series of osteotomes are utilized to reduce the impaction fracture, and bone graft is packed behind the fracture.	The bone graft is used to help hold the reduction in place.
The ACL is fixated in the tibia with a 9-mm × 20-mm screw.	The knee should be in full extension with neutral rotation.
The MCL is fixed on the femur with a 7-mm × 20-mm bioabsorbable screw.	This should be fixated in 20° to 30° of flexion with neutral rotation and a slight varus force.
The MCL proximal tibial attachment is recreated with a Q-Fix.	This Q-Fix should be placed 15 mm distal to the joint line.
Deep and superficial incisions are closed with suture.	The patellar bone troughs from the patellar tendon graft harvest should be packed with any extra bone graft and the peritenon should be closed.

ACL, anterior cruciate ligament; MCL, medial collateral ligament.

(Mizho OSI) and the nonsurgical leg in an abduction stirrup (Birkova Product LLC).

Graft Harvest

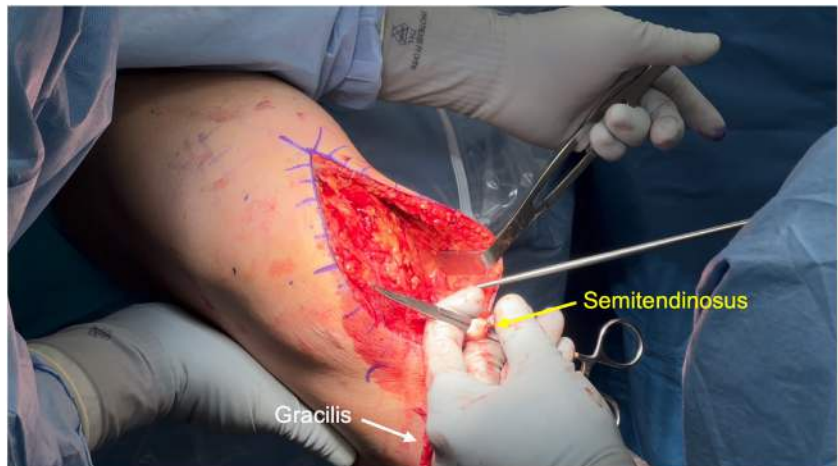
An anteromedial incision is made from the vastus medialis oblique muscle distally to 8 cm below the joint line (Fig 1). The ACL graft is harvested first. A central third patellar tendon autograft is harvested with a 10-mm × 20-mm patellar bone plug and a

10-mm × 25-mm tibial tubercle bone plug. Next, dissection is performed down to the attachments of the gracilis and semitendinosus tendons at the pes anserine bursa. A combination of a large Cobb elevator, Metzenbaum scissors, and the physician's fingers should be used to remove all adhesions from the tendons. An open hamstring harvester is used to harvest the gracilis and semitendinosus autografts, which are left attached distally (Fig 2).

Fig 1. Anteromedial incision for a right knee anterior cruciate ligament (ACL) reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. This incision (black arrow) is made from over the vastus medialis to 8 cm distal to the joint line. This incision allows for the ACL graft harvest, MCL graft harvest and reconstruction, and open reduction of lateral femoral condyle impaction fracture from the same incision.



Fig 2. Hamstring autograft harvest for the medial collateral ligament (MCL) reconstruction for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. Both the gracilis (white arrow) and semitendinosus (yellow arrow) autografts should be harvested. A Metzenbaum scissors, Cobb elevator, and the physician's finger are used to remove adhesions to prevent amputating the grafts. The grafts should be left attached to the tibia.



MCL Reconstruction

The distal tibial fixation of the MCL reconstruction graft is performed first. Two Q-Fix suture anchors (Smith & Nephew) are fixed 6 cm distal to the joint line at the distal anatomic attachment of the MCL on the tibia (Fig 3). Both the gracilis and semitendinosus autografts are fixed to these suture anchors. Dissection is then carried out proximally to the femoral attachment of the MCL. The adductor magnus tendon is identified first to help identify the adductor tubercle. From the adductor tubercle, measuring 12 mm distal and 8 mm anterior helps to identify the medial epicondyle and the MCL femoral attachment. The soft tissue is resected at this location, and a beath pin is drilled anterolaterally across the femur using a femoral guide (Arthrex) (Fig 4). This is over-reamed with a 7-mm acorn reamer to a depth of 35 to

40 mm, and a passing stitch is placed. A passage is made under the remaining sartorius fascia, and the hamstring autografts are passed proximally. The grafts are measured, whipstitched, and trimmed so that 30 mm will fit into the tunnel (Fig 5).

Arthroscopy

Medial and lateral parapatellar arthroscopic portals are made and the joint is insufflated with saline. The ACL remnant is debrided, and the lateral femoral notch is cleared off to identify the femoral attachment site, midway between the anteromedial and posterolateral bundles of the ACL. An accessory medial portal is created, the knee is placed into deep flexion, and the ACL transtibial guide (Arthrex) is used to drill a beath pin anterolaterally out the femur. A 10-mm low-profile reamer (Arthrex) is used to drill to a

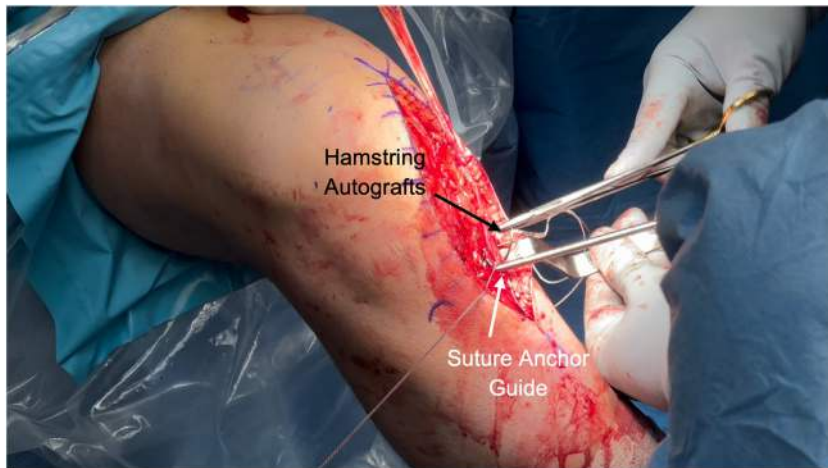


Fig 3. Suture anchor placement for the distal tibial fixation of the medial collateral ligament (MCL) reconstruction for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. Two suture anchors should be placed 6 cm distal to the joint line at the distal tibial anatomic attachment of the MCL. Care should be taken to avoid placing these suture anchors too anterior. The second suture anchor guide (white arrow) is left in place to be used as a post to properly tension the hamstring autografts. The suture anchors are fixed to both hamstring autografts (black arrow).

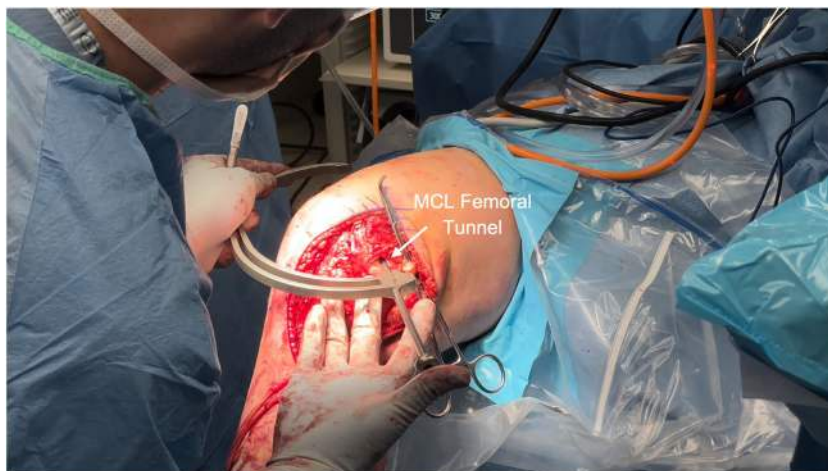


Fig 4. Guide pin placement for the femoral tunnel for a medial collateral ligament (MCL) reconstruction for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. This guide pin should be placed at the anatomic attachment of the MCL. The adductor tendon can be utilized to help find the adductor tubercle. The medial epicondyle is 12 mm distal and 8 mm anterior to the adductor tubercle. The MCL femoral attachment is just posterior and proximal to the medial epicondyle.

depth of 20 mm while maintaining a 2-mm back wall (Fig 6).

Arthroscopic exploration is now performed to identify the LFC impaction fracture and the posterior lateral meniscus radial tear (Fig 7). To begin the inside-out repair of the lateral meniscus, a probe is placed inside the joint to identify the location on the skin for the lateral meniscus repair incision. The lateral incision is made and the interval above the lateral gastrocnemius tendon and biceps tendon and posterior to the lateral joint capsule is entered. A spoon is placed in this interval to prevent posterior neurovascular damage from the inside-out repair sutures. Inside-out sutures are placed through the radial tear in a rip-stop formation with 2 vertical mattress sutures placed first, followed by 3 to 4 horizontal mattress sutures (Fig 8). The horizontal mattress sutures are used to approximate the edges of the radial tear.

The ACL tibial attachment, adjacent to the anterior root attachment of the lateral meniscus, is identified.

An ACL tibial guide (Arthrex) is used to drill a guide pin through the ACL tibial attachment (Fig 9). This is overreamed with a 10-mm reamer. The ACL graft is passed up the tibial tunnel and secured into the femoral tunnel with a 7-mm \times 20-mm titanium screw (Smith & Nephew).

LFC Impaction Fracture

A lateral parapatellar mini-arthrotomy is now made for visualization to reduce the lateral femoral impaction fracture. Retractors are placed and a series of osteotomes are used to elevate and reduce the impaction fracture (Fig 10). Viewing with the arthroscope from the arthrotomy, the fracture should be reduced until the normal radius of curvature of the lateral femoral condyle is restored (Fig 11). Bone graft is harvested from adjacent to Gerdy's tubercle (or from the tibial tubercle bone-tendon-bone plug trough) using a large curette. The bone is then packed into the reduction site.

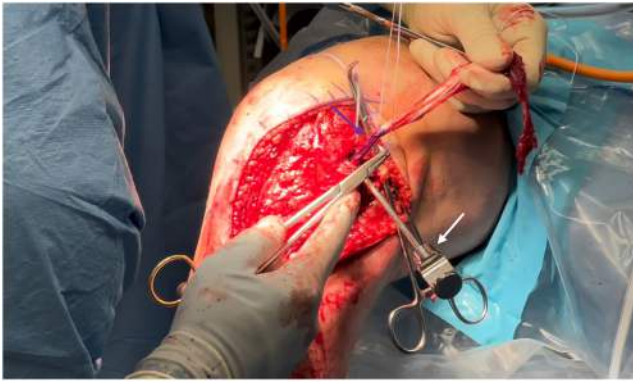


Fig 5. Autograft preparation for a medial collateral ligament (MCL) reconstruction for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The hamstring autografts are passed deep to the sartorial fascia and proximally up to the location of the femoral tunnel. The hamstring autografts are measured so 30 mm of the grafts will fit into the tunnel (purple arrow). A blunt obturator is placed into the MCL femoral tunnel (white arrow) to facilitate MCL autograft length measurement. The grafts are whipstitched together, and then the excess portion of the grafts is cut.

Graft Fixation

The ACL graft is tensioned, the knee is cycled, and then a 9-mm \times 20-mm titanium screw (Smith & Nephew), with the knee in extension and neutral rotation, is used to secure the graft in the tibia (Fig 12). Next, the MCL graft is pulled into the femoral tunnel and secured with a 7-mm \times 20-mm bioabsorbable screw (Smith & Nephew) with the knee at 20° of flexion with a slight varus force (Fig 13). Finally, the proximal tibial attachment of the MCL is reconstituted using a Q-Fix suture anchor (Smith & Nephew) placed 15 mm distal to the joint line (Fig 14). The deep and superficial tissues are closed with suture.

Postoperative Protocol

Following the procedure, the patient will be non-weightbearing for 6 weeks. The patient should limit motion to 90° for the first 2 weeks. After 6 weeks, radiographs will be obtained to determine if the patient can initiate the weightbearing progression. The patient should avoid squatting and sitting cross-legged for 4 months to protect the radial tear repair.

Discussion

Injuries involving the ACL and MCL are one of the most common injury patterns in multiligament knee injuries, with a reported incidence of 20.7% to 36.7%.⁵⁻⁷ This injury combination is likely due to a pivot-shift mechanism that results in a significant anterior tibial translation and valgus force, which

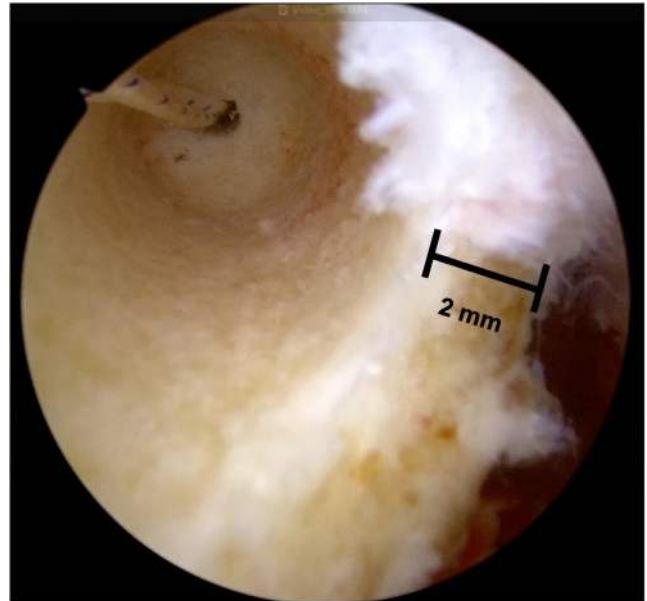


Fig 6. Anterior cruciate ligament (ACL) femoral tunnel via arthroscopic visualization through an anteromedial portal for a right knee ACL reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. A 2-mm bone bridge (black lines) should be maintained on the posterior border of the tunnel to avoid blowing the graft out the back. The femoral tunnel depth is determined by the length of the patellar bone plug on the bone–patellar tendon–bone autograft and a passing stitch is placed.

affect both the ACL and MCL.¹ In severe cases, the lateral tibial plateau can impact against the LFC, causing an impaction fracture and lateral meniscus radial tear due to pinching between the condyles.^{1,2,12} This LFC and lateral tibial plateau impaction fracture presentation has been described in depth by Bernholt et al.^{2,12}

Good outcomes are reported for concomitant ACL and MCL reconstructions, especially when performed in the acute phase.^{13,14} For MCL injuries specifically, repair or nonoperative treatment is an option; however, when medial gapping >3.2 mm with valgus stress at 30° of flexion, a grade III MCL injury should be suspected.⁸ Studies by Dong et al.¹⁵ and LaPrade et al.⁹ have both reported improved patient outcomes when performing a concomitant ACL and MCL reconstruction. Both studies reported significant decreases in instability assessed by anterolateral instability and valgus stress, respectively.^{9,15} The advantages and disadvantages of this technique are summarized in Table 2.

Disclosures

The authors declare the following financial interests/personal relationships which may be considered as

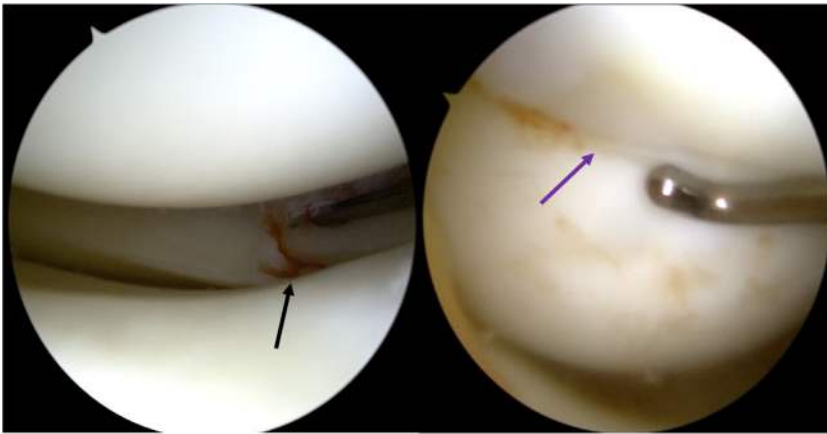


Fig 7. Arthroscopic probing for a right knee anterior cruciate ligament (ACL) reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The posterior-based lateral meniscus radial tear (black arrow) is visualized through arthroscopic probing. The lateral femoral condyle notch sign impaction fracture (purple arrow) is also visualized arthroscopically.

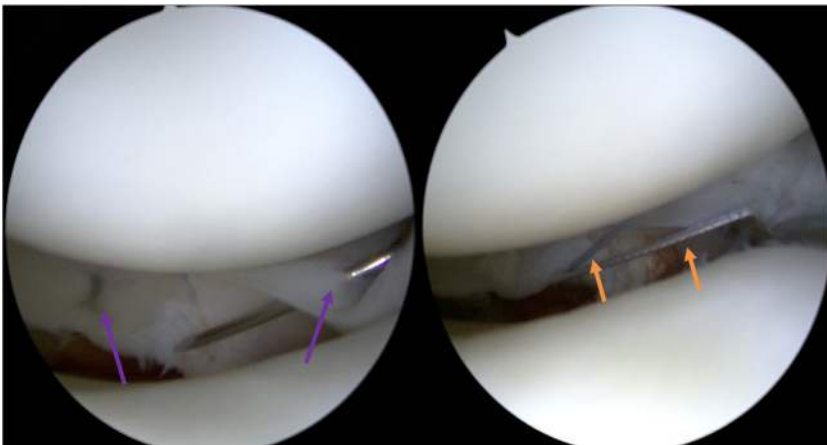


Fig 8. Lateral meniscus radial tear repair for a right knee anterior cruciate ligament (ACL) reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. A rip-stop hashtag repair should be performed. Two vertical mattress (purple arrows) sutures are placed on either side of the radial tear. Horizontal mattress sutures (orange arrows) are then placed outside both vertical mattress sutures to pull the edges of the radial tear together. Three to 4 horizontal mattress sutures should be placed on the superior and inferior surface of the meniscus.

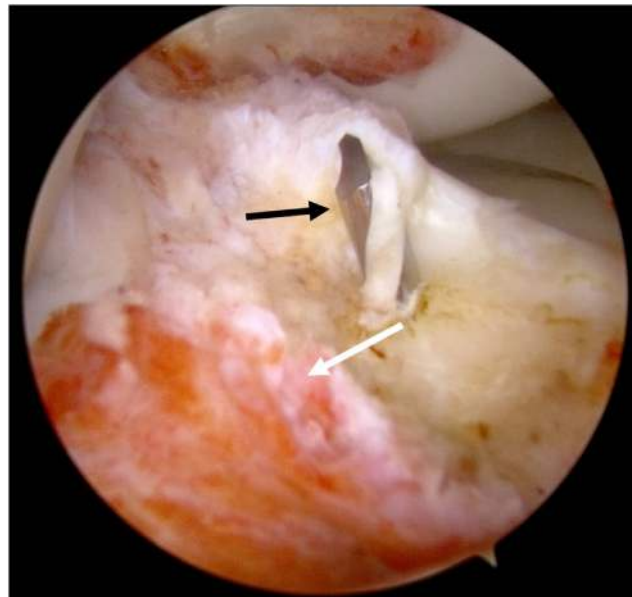


Fig 9. Anterior cruciate ligament (ACL) tibial tunnel guide pin placement via arthroscopic visualization for a right knee ACL reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The soft tissue stump of the ACL should be removed to properly visualize where the guide pin will exit on the tibial plateau. The guide pin (black arrow) and tibial tunnel should be in line with the anterior root of the lateral meniscus (white arrow). Care should be taken when reaming the tibial tunnel to avoid damaging the intercondylar notch cartilage margins.

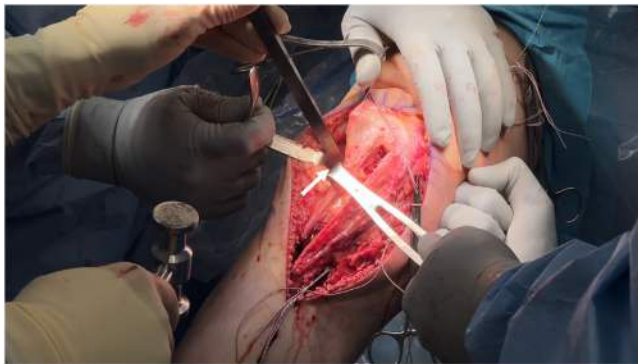


Fig 10. Reduction of the lateral femoral condyle impaction fracture for a right knee anterior cruciate ligament (ACL) reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. A lateral mini-arthrotomy is performed to properly visualize the impaction fracture. A series of osteotomes (white arrow) are used to reduce the fracture. Autograft bone graft is packed in behind the impaction fracture to maintain the reduction.

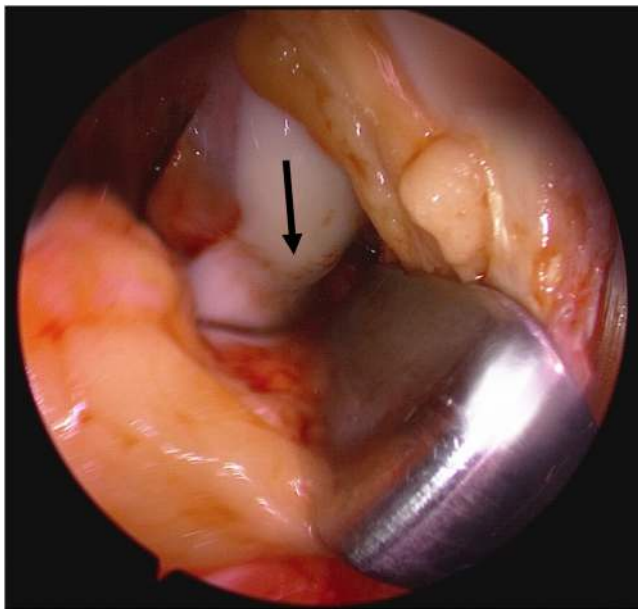


Fig 11. Lateral arthrotomy for visualization of the reduction of the lateral femoral condyle impaction fracture for a right knee anterior cruciate ligament (ACL) reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The arthroscope can be used to visualize the impaction fracture with the arthrotomy (black arrow). Once the reduction is complete, bone graft is packed in behind the impaction fracture to stabilize the reduction.

potential competing interests: R.F.L. has received funding grants from Ossur, Smith & Nephew, Arthroscopy Association of North America, and American



Fig 12. Anterior cruciate ligament (ACL) tibial tunnel fixation for a right knee ACL reconstruction, medial collateral ligament (MCL) reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. After fixation in the femur, the graft should be tensioned through the tibia and the knee should be cycled several times to ensure there is no slack in the graft. Then, with the knee in extension, a 9-mm x 20-mm titanium interference screw (white arrow) is used to fix the tibial bone plug on the anteromedial border of the tibial tunnel.



Fig 13. Medial collateral ligament (MCL) femoral tunnel fixation for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The hamstring MCL autograft should be pulled into the femoral tunnel, and a guidewire is placed at the desired location for the 7-mm x 20-mm bioabsorbable screw (white arrow). The knee should be placed in 30° of flexion with a slight varus force for fixation.

Orthopaedic Society for Sports Medicine; is a consultant or advisor for Ossur, Smith & Nephew, and Responsive Arthroscopy; has received travel reimbursement from Smith & Nephew; has received speaking and lecture fees from Foundation Medical, LLC; and has a patent with royalties paid to Ossur. All other authors (L.V.T., E.P.S., N.J.S., E.L.S.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

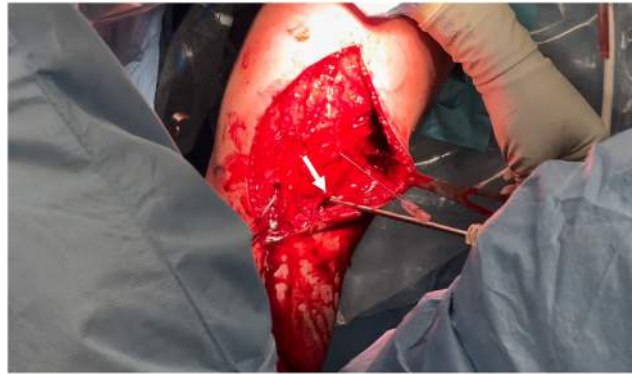


Fig 14. Medial collateral ligament (MCL) proximal tibial fixation for a right knee anterior cruciate ligament (ACL) reconstruction, MCL reconstruction, lateral meniscus repair, and lateral femoral condyle impaction fracture reduction. The final fixation for the MCL occurs 15 mm distal to the joint line at the proximal anatomic attachment of the MCL on the tibia. A single Q-Fix (Smith & Nephew) suture anchor (white arrow) is placed at this location and fixated to the graft, which has already been passed and fixed at both the distal tibia and femur.

Table 2. Advantages and Disadvantages of a Combined Anatomic Anterior Cruciate Ligament and Medial Collateral Ligament Reconstructions Using Autograft

Advantages	Disadvantages
Anatomic reconstruction of both the ACL and MCL	Donor site morbidity from autograft harvest of the hamstring tendon and patellar tendon
Reduced operative cost using autografts for both ACL and MCL	Increased surgical time using autografts and reducing fracture
Inside-out repair of the lateral meniscus leads to less iatrogenic meniscus damage compared to an all-inside repair	Potential for iatrogenic damage during the reduction or meniscus repair
Reduction of lateral femoral condyle impaction fractures restores cartilage surface	Extra incision for inside-out radial tear repair
Meniscus repair helps reduce the progression of lateral compartment osteoarthritis	

ACL, anterior cruciate ligament; MCL, medial collateral ligament.

References

- Mostowy M, Ruzik K, Ebisz M, LaPrade RF, Malinowski K. Impaction fractures of the lateral femoral condyle related to anterior cruciate ligament injury: A scoping review concerning diagnosis, prevalence, clinical importance, and management. *Clin Orthop Surg* 2023;15: 781-792.
- Bernholt DL, DePhillipo NN, Crawford MD, Aman ZS, Grantham WJ, LaPrade RF. Incidence of displaced posterolateral tibial plateau and lateral femoral condyle impaction fractures in the setting of primary anterior cruciate ligament tear. *Am J Sports Med* 2020;48:545-553.
- Song GY, Zhang H, Wang QQ, Zhang J, Li Y, Feng H. Bone contusions after acute noncontact anterior cruciate ligament injury are associated with knee joint laxity, concomitant meniscal lesions, and anterolateral ligament abnormality. *Arthroscopy* 2016;32:2331-2341.
- Berthold DP, Muench LN, Herbst E, et al. High prevalence of a deep lateral femoral notch sign in patients with anterior cruciate ligament (ACL) and concomitant posterior root tears of the lateral meniscus. *Knee Surg Sports Traumatol Arthrosc* 2021;29:1018-1024.
- LaPrade RF, Chahla J, DePhillipo NN, et al. Single-stage multiple-ligament knee reconstructions for sports-related injuries: Outcomes in 194 patients. *Am J Sports Med* 2019;47:2563-2571.
- Nagaraj R, Shivanna S. Pattern of multiligament knee injuries and their outcomes in a single stage reconstruction: Experience at a tertiary orthopedic care centre. *J Clin Orthop Trauma* 2021;15:156-160.
- Poploski KM, Lynch AD, Burns TC, et al. Presentation and surgical management of multiple ligament knee injuries: A multicenter study from the Surgical Timing and Rehabilitation (STaR) trial for MLKIs network. *J Bone Joint Surg Am* 2023;105:607-613.
- LaPrade RF, Bernhardson AS, Griffith CJ, Macalena JA, Wijdicks CA. Correlation of valgus stress radiographs with medial knee ligament injuries: An in vitro biomechanical study. *Am J Sports Med* 2010;38:330-338.
- LaPrade RF, DePhillipo NN, Dornan GJ, et al. Comparative outcomes occur after superficial medial collateral ligament augmented repair vs reconstruction: A prospective multicenter randomized controlled equivalence trial. *Am J Sports Med* 2022;50:968-976.
- Benhenneda R, Alajji M, Portet A, Sonnery-Cottet B, Fayard JM, Thaumat M. Repair of radial tears of the lateral meniscus on a stable knee: Results at a minimum follow-up of 2 years. *Orthop Traumatol Surg Res* 2024;110:103877.

11. Therrien E, Langhans MT, Lamba A, et al. Outcomes of lateral meniscal oblique radial tear repair compared with intact meniscus after ACL reconstruction: A cohort study. *Orthop J Sports Med* 2023;11:23259671231216102.
12. Bernholt DL, Dornan GJ, DePhillipo NN, Aman ZS, Kennedy MI, LaPrade RF. High-grade posterolateral tibial plateau impaction fractures in the setting of a primary anterior cruciate ligament tear are correlated with an increased preoperative pivot shift and inferior postoperative outcomes after anterior cruciate ligament reconstruction. *Am J Sports Med* 2020;48:2185-2194.
13. van der List JP, Muscott RK, Parikh N, Waterman BR, Trasolini NA. Early anterior cruciate ligament treatment might be crucial for acute combined anterior cruciate ligament and medial collateral ligament injuries: A systematic review of the various treatment strategies. *Arthroscopy* 2024;40:2322-2336.
14. Holuba K, Vermeijden HD, Yang XA, O'Brien R, van der List JP, DiFelice GS. Treating combined anterior cruciate ligament and medial collateral ligament injuries operatively in the acute setting is potentially advantageous. *Arthroscopy* 2023;39:1099-1107.
15. Dong J, Wang XF, Men X, et al. Surgical treatment of acute grade III medial collateral ligament injury combined with anterior cruciate ligament injury: Anatomic ligament repair versus triangular ligament reconstruction. *Arthroscopy* 2015;31:1108-1116.