

SUBSPECIALTY PROCEDURES

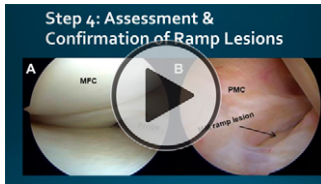
INSIDE-OUT REPAIR OF MEDIAL MENISCAL RAMP LESIONS IN PATIENTS UNDERGOING ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Published outcomes of this procedure can be found at: *Orthop J Sports Med.* 2020 Apr 24;8(4):2325967120912427.

Investigation performed at Twin Cities Orthopedics, Minneapolis, Minnesota

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Abstract

Background: Medial meniscal ramp lesions are disruptions at the meniscocapsular junction and/or meniscotibial attachment of the posterior horn of the medial meniscus, and occur in up to 42% of all acute anterior cruciate ligament (ACL) tears^{1,3-5}. Ramp lesions are frequently missed because of the limited diagnostic sensitivity of magnetic resonance imaging (MRI), physical examination, and standard anterior compartment arthroscopic exploration^{4,6,7}. Arthroscopic evaluation of ramp lesions often requires a modified Gillquist maneuver and/or a posteromedial accessory portal for adequate assessment of the posteromedial “blind spot.”^{4,8-10} Clinically, ramp lesions are associated with increased preoperative anterior knee instability, which may increase the risk of ACL graft failure if left untreated^{6,13}. Although long-term comparative data on ramp-repair techniques are limited, proper arthroscopic assessment and treatment is recommended for all patients with ramp lesions at the time of ACL reconstruction (ACLR)¹⁻⁵. In the present video article, we demonstrate a systematic approach for the identification and assessment of ramp lesions and describe a mini-open inside-out arthroscopically assisted repair technique for unstable ramp lesions at the time of ACLR.

Description: (1) The patient is placed in the supine position, and a contralateral leg holder is utilized to create more working room on the medial side. (2) Standard diagnostic arthroscopy is performed through anteromedial and anterolateral portals. (3) Next, with the arthroscope in the anterolateral portal, the scope is advanced through the intercondylar notch with the knee in 30° of flexion in order to inspect the posterior horn of the medial meniscus. Probing is directed both over the superior aspect of the posterior horn to assess for tears, separation, and/or displacement of the meniscocapsular junction, and under the inferior aspect of the posterior horn to assess the integrity of the meniscotibial attachment. (4) After confirmation of a ramp tear, an open dissection is carried out through the sartorial fascia, with blunt dissection performed anterior to the medial gastrocnemius and above the semimembranosus to create the posteromedial surgical site. (5) A suture-

Disclosure: The Disclosure of Potential Conflicts of Interest forms are provided with the online version of the article (<http://links.lww.com/JBJSST/A462>).

shuttling device is utilized, and the corresponding cannula is placed into the anterolateral portal and directed toward the tear under arthroscopic visualization from the anteromedial portal. (6) Next, the first needle is passed through the meniscus, and the second is delivered through the adjacent capsule to create a vertical or oblique suture pattern. The needles are retrieved from the posteromedial surgical site and promptly cut, and the sutures are tied. (7) Multiple sutures, both above (femoral) and below (tibial) the meniscus, are placed 3 to 5 mm apart in a similar fashion. (8) On completion of the repair, the meniscocapsular junction is probed in order to confirm adequate stability with minimal translation of the medial meniscus.

Alternatives: In the setting of an ACL tear, surgical options for concomitant repair of an unstable ramp lesion include all-inside, inside-out, or hybrid techniques (i.e., outside-in, inside-in, and/or all-inside).

Rationale: Repair of ramp lesions using an inside-out technique restores preoperative excessive knee instability, which may decrease the risk of ACL graft failure. In addition, an inside-out ramp repair has a reported low secondary meniscectomy rate (2%), offers flexibility regarding the number and placement of the sutures, and creates a potentially stronger repair; however, this procedure is more technically challenging compared with other repair techniques^{6,10}. All-inside ramp repairs have been reported to have higher secondary meniscectomy rates, ranging from 11% to 31%, because of the inability to repair the meniscotibial ligament from the anterior portals^{13,14}. Suture hook repair using a posteromedial portal is becoming more popular and reportedly has a significantly lower secondary meniscectomy rate compared with all-inside techniques (19% compared with 30.6%)¹⁵.

Expected Outcomes: At a minimum of 2 years of follow-up, DePhillipo et al. reported similar clinical outcomes and return to sports for patients who underwent combined ACLR plus inside-out repair of ramp lesions (n = 50) compared with a matched cohort who underwent isolated ACLR (n = 50). Although the ACLR plus ramp lesion repair group had had significantly greater preoperative knee instability compared with the isolated ACLR group, there was no difference in postoperative instability between groups at an average of 2.8 years (range, 2 to 8 years) of follow-up⁶.

Important Tips:

- The exterior posteromedial incision should be facilitated by inside-out transillumination of the medial compartment and by palpation using an intra-articular probe at the medial aspect of the joint in order to avoid saphenous vein injury¹⁰.
- Two-thirds of the posteromedial incision should be distal to the joint line, with one-third proximal, because the suture needles often angle downwards as they exit the capsule¹⁰.
- The pes anserinus tendons should be retracted during the posteromedial dissection in order to avoid injury to the saphenous nerve (which lies posteromedial to the tendons)¹⁰.
- 70° to 90° of flexion relaxes the hamstring and gastrocnemius, which improves visualization and aids in retrieval of the suture needles as they exit the posterior capsule¹⁰.
- Entering the anterolateral portal with the suture-delivery device decreases the risk of neurovascular damage and optimizes the direction of the needle¹⁰.
- After placement of the first needle, keep slight tension on the first suture to avoid inadvertent suture damage during advancement of the second needle¹⁰.
- Recent reports have suggested that ramp lesions can occur in isolation without ACL injury or accompanying isolated or combined posterior cruciate ligament (PCL) tears. Do not forget to assess for ramp lesions in these scenarios¹⁶.

Acronyms:

- ACL = anterior cruciate ligament
- PCL = posterior cruciate ligament
- MMBH = medial meniscus bucket-handle

- MRI = magnetic resonance imaging
- MFC = medial femoral condyle
- MTP = medial tibial plateau
- PMC = posteromedial capsule
- MM = medial meniscus
- AT = adductor tubercle
- sMCL = superficial medial collateral ligament
- SM = semimembranosus
- MGT = medial head of gastrocnemius tendon
- ACLR = anterior cruciate ligament reconstruction
- PROMs = patient-reported outcome measures
- MTL = meniscotibial ligament

Acknowledgment

NOTE: The video files describing the anatomy of medial meniscus ramp lesions and arthroscopic images of ramps lesions and those showing steps 5, 6, 7, and 9 of the procedure were reused from previous open access publications by senior author R.F.L., with permission granted via the open access creative common licenses. (Orthop J Sports Med. 2020 Apr 24;8(4):2325967120912427 and Arthrosc Tech. 2017 Aug 14;6(4):e1315-20.)

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