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KEY PROCEDURES

Arthroscopic Transosseous Repair of a Medial Meniscal Posterior-Root Tear

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Published outcomes of this procedure can be found at: *Am J Sports Med*. 2017;45(4):884-91, *Arthroscopy*. 2009;25(9):951-8, and *Arthroscopy*. 2018;34(2):530-5.

Investigation performed at the Department of Orthopedic Surgery, University of Minnesota, Minneapolis, Minnesota

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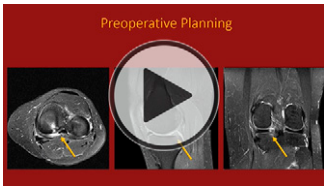

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Abstract

Background: Meniscal root tears are soft-tissue and/or osseous injuries characterized by an avulsion of, or tear within 1 cm of, the native meniscal insertion[1]. These injuries account for 10% to 21% of all meniscal tears, affecting nearly 100,000 patients annually[2]. Medial meniscal posterior-root tears (MMPRTs) expose the tibiofemoral joint to supraphysiologic contact pressure, decreased contact area, and altered knee kinematics similar to a total meniscectomy[3]. This injury predisposes the patient to exceedingly high rates of osteoarthritis and total knee arthroplasty secondary to an inability to resist hoop stress[4]. The arthroscopic transosseous repair of an MMPRT is described in the present article.

Description: (1) Preoperative evaluation, including patient history, examination, and imaging (i.e., radiographs and magnetic resonance imaging). (2) Preparation and positioning. The patient is placed in the supine position, and anteromedial and anterolateral portals are created. (3) Placement of sutures. Two simple cinch sutures are placed into the posterior horn, within approximately 5 mm of each other. (4) Footprint decortication. Remove articular cartilage from the native root insertion site. (5) Drilling of the transosseous tibial tunnel. Introduce a tibial tunnel guide over the decorticated base, set guide to 45° to 50°, place a 2-cm vertical incision over an anteromedial tibial guide footprint, advance a 2.4-mm guide pin through the guide, and overream to 5 mm. (6) Passing of the sutures with use of a looped suture passer introduced retrograde through the tibial tunnel to retrieve sutures. (7) Anchor placement and fixation. Apply maximum suture traction, drill a second aperture 0.5 to 1.0 cm distal to the original aperture on the anteromedial aspect of the tibia, pass the suture ends through the anchor, and fix the anchor into the aperture. (8) Repair evaluation and closure. Note the position and stability of the meniscal root relative to the native footprint. Standard closure in layers is performed.

Alternatives: If the patient experiences no relief from nonoperative treatment, an MMPRT can be treated operatively via partial meniscectomy or repaired via direct suture-anchor repair or indirect transosseous (transtibial) repair. Direct repair utilizes a suture anchor inserted at the root site[5]. Variations of the present technique include different suture configurations or numbers of tunnels. Although several suture configurations have been described, the

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simple cinch stitch (utilized in the present procedure) has been shown to be better at resisting displacement than the locking loop stitch[6]. Moreover, it has been suggested that simple stitches are less technically difficult and more able to resist displacement because they require less tissue penetration than other stitches[7]. Lastly, procedures that utilize a single versus a second transtibial tunnel have been shown to be equivalent in cadaveric studies[8].

Rationale: The desired results of MMPRT repair include anatomic reduction, preservation of meniscal tissue and knee biomechanics, and preservation of hoop stress, which improve activity, function, and symptoms and mitigate degenerative changes and the risk of progression to total knee arthroplasty.

Expected Outcomes: At a minimum of 2 years after transosseous repair, the Lysholm, Western Ontario and McMaster Universities Osteoarthritis Index, 12-Item Short Form, and Tegner activity scale were significantly improved[8,9]. Previous studies have shown significant improvement in the Hospital for Special Surgery and Lysholm scores without radiographic osteoarthritis progression at the same minimum follow-up[10]. Lastly, in the longest-term follow-up study to date, transosseous repair survivorship was reported to be 99% at 5 years and 92% at 8 years, with failure defined as conversion to total knee arthroplasty[11].

Important Tips:

- Pearls
  - Decorticate the native meniscal root down to bleeding bone.
  - Consider fenestration or percutaneous release of the medial collateral ligament in order to further open a tight medial compartment.
  - A self-retrieving suture passer allows the use of standard arthroscopy portals.
  - A multiuse variable-angle tibial tunnel drill guide allows point-to-point placement over the native meniscal root insertion.
  - A guide with a tip may be easier and more accurate to control.
  - Consider different guides when drilling the tibial tunnel, according to the anatomy of the patient.
  - A low-profile guide may provide better clearance along the condyles.
  - Utilize a cannula when shuttling sutures through the tibial tunnel in order to prevent a soft-tissue bridge.
  - With anchor fixation, consider drilling over a guide pin and tapping when the bone is hard.
  - Study preoperative imaging to evaluate the amount of arthritis present. Evaluate all compartments on magnetic resonance imaging for additional pathology.
- Pitfalls
  - Obliquity of the tibial tunnel can cause the guide pin and reamer to enter too anteriorly.
  - Patient failure to adhere to postoperative rehabilitation and restrictions can lead to unfavorable outcomes.
  - The use of lower-strength sutures may increase the risk of fixation failure.

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