

Multiple Ligament Knee Reconstructions



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Abstract: Patients with multiligament knee injuries require a thorough examination (Lachman, posterior-drawer, varus, valgus, and rotational testing). Diagnoses are confirmed with magnetic resonance imaging as well as stress radiographs (posterior, varus, and valgus) when indicated. Multiple systematic reviews have reported that early (<3 weeks after injury) single-stage surgery and early knee motion improves patient-reported outcomes. Anatomic-based reconstructions of the torn primary static stabilizers and repair of the capsular structures and any tendinous avulsions are performed in a single-stage. Open anteromedial or posterolateral incisions are preferentially performed first to identify the torn structures and to prepare the posterolateral corner (PLC) and medial knee reconstruction tunnels. Next, arthroscopy allows preparation of the anterior cruciate ligament (ACL) and double-bundle (DB) posterior cruciate ligament (PCL) tunnels. Careful attention to tunnel trajectory minimizes the risk for convergence. Meniscal tears are preferentially repaired (root and ramp tears are commonly seen in this patient group). Graft passage is performed after all tunnels are reamed. The graft tensioning and fixation sequence is as follows: anterolateral bundle of the PCL to restore the central pivot, posteromedial bundle of the PCL, ACL, PLC (including fibular [lateral] collateral ligament), and posteromedial corner (including medial collateral ligament). Graft integrity and full knee range of motion should be verified before closure. Physical therapy commences on postoperative day 1 with immediate knee motion (flexion from 0°-90°; prone for DB-PCL reconstruction) and quadriceps activation. Patients are non-weightbearing for 6 weeks. Patients with ACL-based reconstructions wear an immobilizer for 6 weeks then transition to a hinged ACL brace. Patients with PCL-based reconstructions transition into a dynamic PCL brace once swelling subsides and wear it routinely for 6 months. Functional testing and stress radiography are performed to validate return to sports.

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The authors report the following potential conflicts of interest or sources of funding: R.F.L. reports other from Arthrex, personal fees from Arthrex, other from Smith and Nephew, personal fees from Smith and Nephew, other from Ossur, personal fees from Ossur, and other from Linvatec, outside the submitted work and is an Editorial Board Member of AJSM, JEO, and KSSTA.

Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received October 15, 2020; accepted March 17, 2021.

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0749-8063/21418/\$36.00

<https://doi.org/10.1016/j.arthro.2021.03.033>

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Multiligament Knee Injuries



TREATMENT APPROACH

- ✓ Magnetic resonance imaging and stress radiographs recommended
- ✓ Acute (within 3 weeks) single-stage surgical treatment recommended
- ✓ Open anteromedial and posterolateral incisions for extra-articular ligament reconstruction and repair of tendons and capsular structures
- ✓ ACL and double-bundle PCL reconstruction
- ✓ Repair of meniscus injuries (root tears and ramp lesions common)
- ✓ Graft tensioning sequence:
 - 1 PCL
 - 2 ACL
 - 3 PLC and FCL
 - 4 PMC and MCL

LIGAMENT RECONSTRUCTION

ACL



PCL



PLC AND FCL



PMC AND MCL



POST-OPERATIVE CARE

- ✓ 0-90° ROM on postoperative day 1 PT
- ✓ Non-weightbearing for 6 weeks
- ✓ ACL- or PCL-specific functional knee brace

KEYS TO SUCCESS

- ✓ Anatomic ligament reconstruction
- ✓ Address malalignment in chronic injuries
- ✓ Avoid tunnel convergence and achieve secure fixation

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Disclosure of potential author conflicts of interest are available at www.arthroscopyjournal.org