

Posterolateral Corner Reconstruction

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Abstract: The posterolateral corner is a vital stabilizer against varus, posterior, and rotational forces in the knee. In significant posterolateral corner deficiency, there is general consensus that reconstruction of the most important stabilizing structures—the popliteofibular and lateral collateral ligaments—should be performed. In this report, we describe a straightforward and reproducible technique for reconstruction of these structures using a “3-window” exposure and a fibular-based allograft.

Key Words: posterolateral corner, ligamentous reconstruction, knee instability

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HISTORICAL PERSPECTIVE

The posterolateral corner (PLC) has become increasingly recognized as vital to normal varus, posterior, and rotational stability of the knee.^{1–3} Injury to this part of the knee can occur in isolation,⁴ but PLC deficiency most commonly presents as one component of a complex multiligamentous deficiency pattern^{5,6} with associated cruciate, medial collateral (MCL), and/or posteromedial capsular (PMC) tears. In recent years, a number of authors have demonstrated that failure to recognize and surgically address significant PLC deficiency lead to higher failure rates of associated ligamentous reconstructions and overall poorer outcomes.^{7–10}

Anatomic studies have shown the PLC to be comprised of multiple structures including the lateral collateral ligament (LCL), popliteus tendon, popliteofibular ligament (PFL), and posterolateral capsule.^{11,12} Although some debate has surrounded the role of acute repair versus reconstruction,^{4,10,13} the majority of patients with PLC deficiency present in subacute or chronic fashion and are therefore best managed with reconstruction. Arrays of reconstructive techniques have been described in the last 2 decades, mirroring the complexity of the PLC anatomy. Initial approaches generally involved nonanatomic procedures, including advancements of the arcuate complex or Iliotibial (IT) band, biceps tenodesis, and other augmentations.^{4,5,11,14,15} In recent years, a greater emphasis has been placed on anatomic reconstructions which generally fall into 2 major categories: those involving a primarily fibular-based reconstruction,^{16,17} or those with an additional transtibial popliteal “bypass” graft.^{18,19} Although there is no current consensus on the best technique for reconstructing the PLC, the bulk of the literature suggests that the most successful operations are those that attempt to restore the LCL and PFL.^{1,3,16,20} In this report, we describe our favored method of reconstructing these elements using a simple fibular-based graft.

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INDICATIONS AND CONTRAINDICATIONS

PLC reconstruction is indicated in active patients with evidence of grade III (complete disruption) injuries or in selected grade II injuries that occur with functional instability and/or concomitant cruciate ligament injury where ACL, PCL, and/or medial-sided reconstructions are planned.^{7–10}

Most authors agree that the isolated grade I and II PLC injuries (<10 mm of varus opening relative to the opposite knee and <10 degrees of external rotation) without functional instability should be treated nonsurgically.^{8,10,11} Likewise, chronic PLC deficiency in patients with significant varus malalignment should be considered for a valgus-producing osteotomy before PLC reconstruction, given the higher failure rates of isolated reconstruction performed in this setting.^{4,14,21} In patients who present after high-energy injuries, concomitant vascular and neurologic dysfunctions should be considered against the potentially minimal benefit of PLC reconstruction in a severely compromised limb. In older patients with concomitant degenerative arthritis, the benefits of ligamentous reconstruction may be outweighed by those of knee replacement. As in the case of other ligamentous reconstructions, surgery should not be undertaken until adequate motion is achieved preoperatively, and is ill-advised in very low-demand patients or those unwilling to comply with postoperative rehabilitation.

PREOPERATIVE PLANNING

In the acute setting, PLC reconstruction must often be managed around associated neurovascular injuries. A limb-threatening vascular injury clearly takes precedence over ligamentous reconstruction and—depending on the nature of associated vascular repair or bypass procedures—may alter the available surgical approach for PLC reconstruction. Likewise, associated peroneal nerve injury occurs in 12% to 17% of cases,^{6,22,23} and may necessitate a peroneal neurolysis at the time of surgery for the PLC, in addition to altering the patient’s ability to comply with postoperative rehabilitation and potentially affecting long-term function.

The surgeon must also carefully evaluate associated musculoskeletal injuries. As noted earlier, PLC injuries rarely occur in isolation. In addition to grading the degree of varus and rotational instability, the ACL, PCL, MCL, and PMC should be carefully examined for any instability objectively graded and correlated with magnetic resonance imaging findings. Associated fractures are not uncommon in high-energy injuries, and should be ruled out on routine preoperative radiographs, as fixation of these fractures is often required before ligamentous reconstruction can be performed. Chondral and/or meniscal pathology should also be considered on examination and preoperative magnetic resonance imaging. Concomitant ligamentous reconstructions and/or meniscal or chondral procedures should be anticipated before arriving in to the operating room, to allow appropriate instrumentation and allografts to be made available.

