



(CASE REPORT)



## Staged reconstruction of bicruciate and posterolateral corner injury after low-energy knee dislocation: A case report

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### Abstract

Knee dislocation is a rare but severe injury frequently associated with multiligament damage and possible vascular compromise. We report the case of a 42-year-old male with no previous medical history who sustained a low-energy knee dislocation following a trampoline accident. Angio-CT ruled out vascular injury. MRI demonstrated complete rupture of both cruciate ligaments and posterolateral corner injury. A staged surgical strategy was adopted: PCL and PLC reconstruction

at 4 weeks, followed by ACL reconstruction 9 months later. At 15-month follow-up, the patient showed full stability, absence of pain, and progressive return to sports. This case supports staged reconstruction as a safe and effective strategy in multiligament knee injuries.

**Keywords:** Knee Dislocation; Multiligament Injury; Staged Reconstruction; Posterolateral Corner; Cruciate Ligament Reconstruction.

### 1. Introduction

Knee dislocation represents a severe form of multiligamentous injury that may compromise limb viability due to potential vascular involvement. While it is traditionally associated with high-energy trauma, low-energy mechanisms can also result in significant ligamentous disruption. The management of bicruciate and posterolateral corner injuries remains controversial, particularly regarding the timing and staging of surgical reconstruction.

Staged procedures have been proposed to reduce the risk of arthrofibrosis and allow progressive restoration of knee stability. This report presents a case of low-energy knee dislocation treated with a staged reconstructive strategy and discusses the clinical rationale behind this approach.

### 2. Case Presentation

A 42-year-old active male with no significant medical or surgical history presented to the emergency department on 11 November 2023 following a trampoline accident. Clinical examination revealed marked knee deformity and severe pain. No neurovascular deficit was detected.

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## 2.1. Diagnostic Assessment

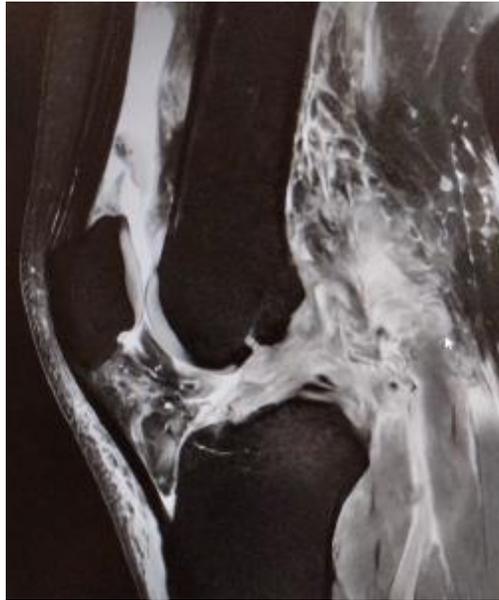
Anteroposterior and lateral radiographs confirmed tibiofemoral dislocation without associated fracture (Figures 1 and 2). Angio-computed tomography excluded vascular injury. Magnetic resonance imaging demonstrated complete rupture of the anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL), associated with posterolateral corner (PLC) injury (Figures 3–6).



**Figure 1** Anteroposterior radiograph obtained in the emergency department demonstrating loss of tibiofemoral congruence consistent with acute knee dislocation, without visible associated fracture



**Figure 2** Lateral radiograph showing posterior translation of the tibia relative to the femur, suggestive of posterior knee dislocation



**Figure 3** Sagittal MRI view demonstrating complete rupture of the anterior cruciate ligament with fiber discontinuity and associated hemarthrosis



**Figure 4** Sagittal MRI image showing complete rupture of the posterior cruciate ligament with loss of ligament continuity



**Figure 5** Coronal MRI view demonstrating injury to the posterolateral corner with disruption of the lateral stabilizing structures



**Figure 6** Coronal MRI confirming multiligamentous injury without associated major meniscal lesion

## 2.2. Therapeutic Intervention

A staged surgical strategy was adopted.

The first stage was performed four weeks after injury and consisted of arthroscopic posterior cruciate ligament reconstruction using a quadrupled hamstring autograft (DT4) with TLS fixation. This was combined with posterolateral corner reconstruction using interference screw fixation.

The second stage was carried out on 20 August 2024 and consisted of arthroscopic anterior cruciate ligament reconstruction using a bone–patellar tendon–bone autograft. Intraoperative assessment confirmed satisfactory integration and tensioning of the PCL graft.

Postoperative radiographs demonstrated appropriate tunnel positioning and joint alignment (Figures 7 and 8).



**Figure 7** Anteroposterior radiograph obtained in post operative, the joint space is symmetric



**Figure 8** Lateral radiograph showing the tibial tunnel

### 2.3. Follow-Up and Outcomes

At 3-month follow-up after ACL reconstruction, mild quadriceps hypotrophy was noted with stable Lachman test. At 15-month follow-up (06/02/2025), the patient reported no instability, no pain, and progressive return to sports. Clinical examination showed a stable knee without residual laxity.

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### 3. Discussion

Management of multiligament knee injuries (MLKI) remains controversial, particularly regarding surgical timing and reconstruction strategy.

Fanelli GC and Edson CJ emphasized the importance of restoring posterior stability in combined PCL injuries to reduce residual laxity. In our case, PCL reconstruction was performed first to re-establish posterior control.

LaPrade RF demonstrated that untreated posterolateral corner (PLC) injuries increase cruciate graft failure rates, supporting combined PCL and PLC reconstruction in the initial stage.

Levy BA reported that staged reconstruction protocols may reduce arthrofibrosis compared with acute single-stage surgery in severe knee dislocations. Our patient developed no postoperative stiffness.

According to the classification described by Schenck RC, this injury corresponds to a KD-III pattern, requiring individualized management.

Systematic reviews by Mook WR confirm that both single-stage and staged procedures achieve good stability outcomes, though staged reconstruction may lower stiffness rates in complex injuries.

Overall, our case supports staged reconstruction prioritizing posterior stabilization as a safe and effective strategy, even in low-energy knee dislocations.

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#### **4. Conclusion**

Staged reconstruction of bicruciate and posterolateral corner injuries after knee dislocation appears to provide excellent functional and stability outcomes while minimizing the risk of arthrofibrosis. Prioritizing posterior stabilization before ACL reconstruction may represent a safe and reproducible strategy in selected patients.

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#### **Compliance with ethical standards**

##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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