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Lateral Meniscal Root Avulsion with Incarceration in the Popliteal Hiatus in the Setting of a Multiligamentous Knee Injury in a Female Skier: A Case Report

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INTRODUCTION

- Multiligamentous knee injuries (MLKI) are a complex surgical entity with multiple proposed approaches to treatment.¹
- The accepted definition of MLKI is injury to at least two of the four major knee ligament structures (ACL, PCL, PMC, PLC).²
- The most common injury pattern occurs in the setting of dislocation and includes a combined disruption of the ACL, PCL, and PLC.²
- When MLKI is diagnosed, a complete and detailed assessment is required in addition to a strategic approach to treatment.¹

CASE PRESENTATION

- A 45-year-old female presented to the ED after a twisting ski accident without binding release followed by immediate swelling and pain.
- MRI showed complete rupture of the ACL, PCL, proximal MCL, and femoral-sided MPFL. The lateral meniscal root was torn, and the posterior horn flipped superiorly into the popliteal hiatus.
- We first addressed the lateral meniscus avulsion and extra-articular ligaments including MCL and MPFL. After eight weeks and return of ROM we returned for ACL and PCL reconstruction.



Figure 1. Left knee XR AP, Lateral, and Sunrise views showing no obvious fracture and subluxation of the patella indicative of MPFL injury or complete rupture.



References: ¹Levy et al. Decision making in the multiligament-injured knee: an evidence-based systematic review. Arthrosc J Arthrosc Relat Surg Off Publ Arthrosc Assoc N Am Int Arthrosc Assoc. 2009;25(4):430-438. doi:10.1016/j.arthro.2009.01.008. ²Becker EH, Watson JD, Dreese JC. Investigation of multiligamentous knee injury patterns with associated injuries presenting at a level I trauma center. J Orthop Trauma. 2013;27(4):226-231. doi:10.1097/BOT.0b013e318270def4. ³Goebel CP, Domes C. Classifications in Brief: The Schenck Classification of Knee Dislocations. Clin Orthop. 2020;478(6):1368-1372.

Figure 2 (A-F). (A) T2 weighted MRI image, coronal view. Shows MCL avulsion off the femur. (B) T2 weighted MRI image, sagittal view. Shows complete anterior cruciate ligament tear. (C) T2 weighted MRI image, sagittal view. Shows complete PCL tear. (D) T2 weighted MRI image, coronal view. Shows lateral meniscus root avulsion that is extruded from the joint and flipped. (E) T2 weighted MRI image, sagittal view. Shows avulsion of the lateral meniscus with the flipped part. (F) T2 weighted MRI image, coronal view. Shows avulsed lateral meniscus is extruded from the joint. (G-H) (G) T2 weighted MRI image, axial view. Shows MPFL avulsion off the femur. (H) T2 weighted MRI image, axial view of complete tear of the posterior root ligament of the lateral meniscus that is extruded from the joint and flipped into the femoral gutter.

Figure 3 (I-J). (I) Arthroscopic image showing flipped meniscus being avulsed from the left side of the image getting stuck and wedged up into the right side of the image which constitutes the popliteal space. (J) Arthroscopic image demonstrating meniscus anchored down to the tibial plateau on the left side of the image. (K) Arthroscopic image demonstrating meniscus anchored down to the tibial plateau on the left side of the image obtained during the 2nd operation.

- and collateral tear.
- damage.
- rupture of both collaterals.
- mentioned above.
- of neurovascular injury.

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SCHENCK ANATOMIC CLASSIFICATION OF MLKI³ • Based on the number and type of torn ligaments, Class I includes any combination of cruciate tear

Class II includes bicruciate tears without collateral

• Bicruciate tears with either medial or lateral collateral ligament tears are classified as Class III. Class IV injuries involve bicruciate tears and

• Fracture dislocations are classified as Class V and have any of the ligamentous injury patterns

• Higher-class injuries predict increased likelihood

CONCLUSIONS

• Although treatment approaches to MLKI may vary, classically repair or reconstruction of the extraarticular structures with a delayed reconstruction of the cruciate ligaments once full ROM has been restored is typical.

• In this case, structural and functional restoration were attained using a two-staged approach in which we first addressed the displaced LM avulsion and extraarticular ligaments including MCL and MPFL followed by ACL and PCL reconstruction in the second stage.

• This order of repair was necessary and ultimately successful, demonstrating that in the case of high-risk meniscus pathology a staged approach is possible to achieve successful repair.