Osteochondral Allograft Transplantation of Posterior Femoral Condyle Lesions Utilizing an Open Posterior Approach to the Knee

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Abstract

Osteochondral allograft transplantation is a viable option for large chondral defects > 2 cm squared as well as in a revision setting after failure of a previous surface chondral restoration procedure. Osteochondral lesions involving the posterior aspect of the femoral condyle, however, are less common and easily under-appreciated. Treatment of posterior osteochondral lesions is more technically demanding as they cannot be adequately addressed through standard arthroscopic approaches or an anterior arthrotomy. The challenges of the posterior approach include the relative unfamiliarity for many surgeons and the inherent risks due to the proximity of the neurovascular structures. The following technique reviews relevant anatomy and approach to osteochondral allograft transplant involving the posterior femoral condyles.

Introduction

Posterior osteochondral lesions of the femoral condyle are uncommon and literature focusing on the treatment of these is limited. Standard anterior arthroscopy cannot fully visualize the most posterior articular margin, and damage in the resulting 'hidden zones' of the femoral condyle may be more difficult to treat (1). Direct inspection and access to chondral lesions of the posterior femoral condyle require posterior arthroscopy with the use of additional accessory portals (Figure 1). Arthroscopic treatments are limited to chondroplasty and microfracture while larger lesions require an open approach. The posterior approach to the knee is unfamiliar to many surgeons and the neurovascular structures are inherently at increased risk; however, this is technically safe with meticulous soft tissue management. The following technique reviews the relevant anatomy and approach to the posterior aspect of the knee as well as steps for osteochondral allografting (OCA) of the posterior femoral condyle.

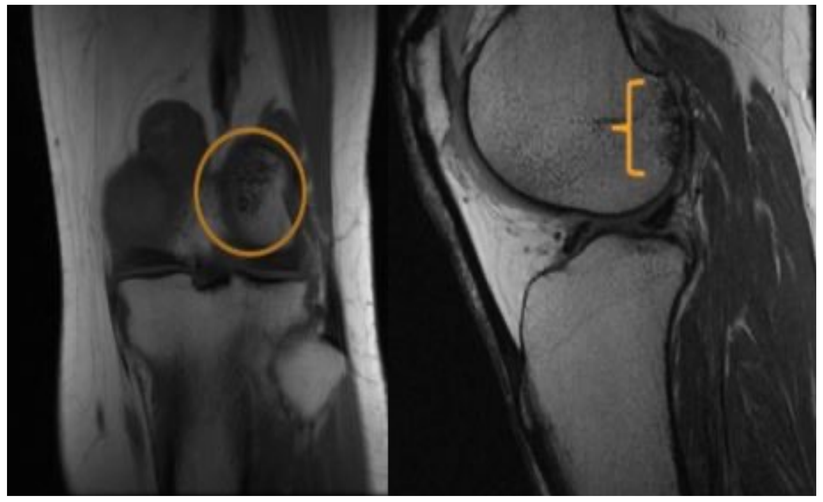

Figure 1: Coronal (a) and sagittal (b) MRI images demonstrating a large posterolateral femoral condyle osteochondral lesion. The majority of this lesion cannot be visualized through standard anteromedial or anterolateral arthroscopy portals.

Figure 8: Final seating of osteochondral allograft plug through the posterior approach to address a posterolateral femoral condyle osteochondral lesion.

Pearls

1. Diagnostic arthroscopy for full evaluation of the lesion and its extent can aid in determining if a posterior approach will be required to address a posterior femoral condyle lesion.
2. Self-retaining ACDF retractor can aid in deep tissue retraction and protection of neurovascular structures during the posterior approach.
3. Range of motion is not initiated until the posterior wound has healed.
4. Attempt to cover as much of the lesion as possible through the posterior approach as it still may be difficult to fully address the remainder of the lesion through an anterior arthrotomy.

Pitfalls

1. The common peroneal nerve resides in the subcutaneous layer and is very superficial at the level of the popliteal fossa. This should be identified early and protected throughout the case. It should be mobilized enough to avoid excessive pressure during retraction.
2. The major neurovascular structures reside relatively midline within the popliteal fossa. This does not necessarily require formal dissection; however, should be positively identified and protected throughout the procedure.
3. Avoid imbrication or overtightening of the posterior capsulotomy during closure to prevent flexion contracture.

Conclusion

Posterior femoral condyle lesions are uncommon and present significant difficulty regarding evaluation, diagnosis, and definitive treatment. These lesions, however, can be approached open and treated effectively with osteochondral allograft. Lesions that cannot be adequately addressed through standard anterior approaches may be safely and effectively addressed through an open posterior approach. Thorough knowledge of the relevant anatomy and meticulous soft tissue handling is critical to performing this safely.