

A CASE OF A BUCKET-HANDLE TEAR OF THE LATERAL MENISCUS

AUTHORS: Michaelyn Cornish, OMS-3 (mc00922@pcom.edu)¹, Kimberly Gardner, MD²

INSTITUTIONAL AFFILIATIONS: 1. Philadelphia College of Osteopathic Medicine 2. Beebe Healthcare

CASE INTRODUCTION

An 18-year-old male presents to his PCP for pain in his right lateral knee after a track-related injury with reported patellar dislocation. He reports pain, swelling, episodes of knee-locking and instability during weight-bearing activities.

CASE DETAILS

A non-contrast MRI of the right knee was obtained.

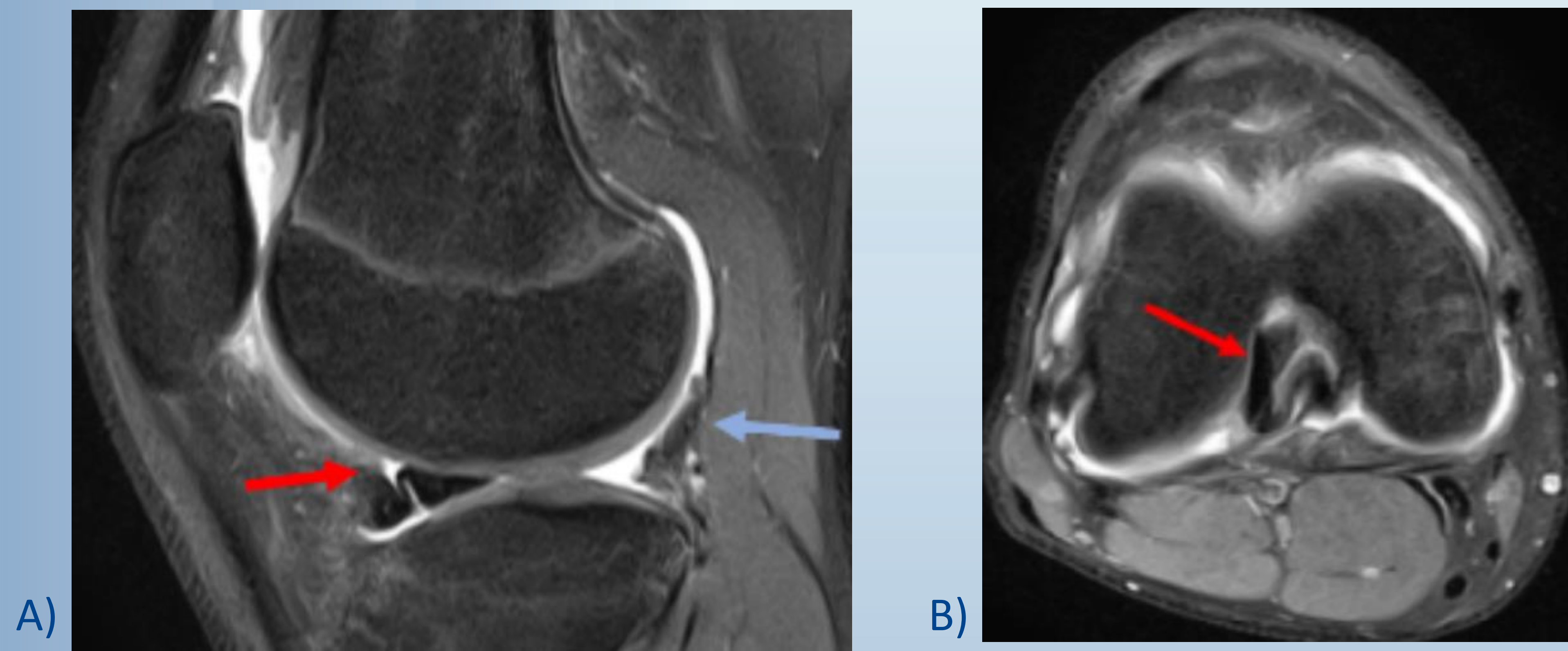


Figure 1: A.) Sagittal proton density fat-saturated MRI without contrast of the right knee. Showing a fluid-filled cavity (absent bow tie sign) in the expected location of the posterior horn of the lateral meniscus (blue arrow). A bucket-handle type fragment is observed flipped anteriorly (red arrow), characterized by two triangular structures (double delta sign). B.) Axial proton density fat-saturated MRI without contrast of the right knee reveals the flipped fragment of the posterior horn of the lateral meniscus in the intercondylar notch as indicated by the red arrow.



Figure 2: In the coronal T2 fat-saturated magnetic resonance imaging without contrast of the right knee, a torn body of the lateral meniscus is indicated with a red arrow. A bucket handle fragment of the lateral meniscus is observed flipped anteriorly and medially into the intercondylar notch adjacent to the ACL, indicated by the blue arrow.

DISCUSSION

Meniscal tears often result from trauma in younger individuals, commonly associated with twisting the knee while flexed with the corresponding foot planted. Such actions are frequently observed in sports with rapid deceleration and sudden changes in direction. Meniscal injuries are commonly attributed to degenerative changes in older patients.

Medial meniscal tears are more common than lateral tears (81 and 19%, respectively). This discrepancy may be attributed to the more secure attachment of the medial meniscus to the joint capsule and medial collateral ligament, limiting its movement to a few millimeters, while the lateral meniscus, less securely attached, can move up to 1 centimeter. The lateral meniscus is more peripherally attached to the joint capsule making it less susceptible to injury during knee flexion compared to the medial meniscus.

Meniscal tears can be classified as radial, vertical longitudinal, complex, bucket handle and horizontal. Bucket-handle tears, comprising 10%-26% of all meniscal tears, are vertical or oblique tears of the meniscus with longitudinal extension toward the anterior horn in which the inner fragment is frequently displaced toward the intercondylar notch. The term “bucket handle” depicts the inner displaced fragment of the meniscus resembling a handle, with the non-displaced portion resembling a bucket.

MRI, with a sensitivity and specificity of 91.4% and 81.1%, respectively, for medial meniscal tears, and 76% and 93.3%, respectively, for lateral meniscal tears, is a crucial diagnostic tool that accurately defines the extent and type of meniscal tears.

Characteristic signs of a bucket-handle tear are optimally visualized on sagittal MRI. The double delta sign, denoting two triangular structures at the anterior meniscus, and the absent bow tie sign, reflecting a loss of the typical bow tie appearance in sagittal MRI views, are key indicators of bucket-handle tears.

Arthroscopic meniscal repair is a common procedure, particularly when the tear is located near the vascular periphery and the fragment retains its morphological integrity. This approach is most beneficial in cases of acute trauma and within well-perfused zones of the meniscus and has proven to be especially effective in repair of vertical and horizontal meniscal tears.

CASE POINTS

- Bucket-handle tears, characterized by displaced longitudinal tears in the meniscus, are three times more prevalent in the medial meniscus than the lateral meniscus, mainly due to anatomic factors.
- Lateral meniscal tears exhibit greater anterior displacement of posterior horn tissues than medial tears.
- MRI is the best noninvasive technique for detecting bucket-handle tears.

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