Misdiagnosis of an Atypical Cyclops Lesion 4 Years After Single-bundle Anterior Cruciate Ligament Reconstruction

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Abstract

Development of a cyclops lesion is a well described complication after anterior cruciate ligament (ACL) reconstruction. It commonly results in gradual extension loss during the early postoperative course, and magnetic resonance imaging (MRI) of the soft tissue nodule attached to the ACL graft is needed. Cyclops lesions are easy to diagnose based on the symptoms and MRI findings. Previous study showed that 78.6% of cyclops lesions had extension loss within 6 weeks postoperatively, and the diagnosis of 92.8% cases of cyclops lesions was established within 6 months.

This article describes a case of misdiagnosis of a cyclops lesion 4 years after ACL reconstruction as a meniscal lesion combined with a meniscal cyst. The patient was asymptomatic for 4 years and then presented with a locked left knee and pain at the inferior pole of the patella during an attempt to gently extend the knee. Magnetic resonance imaging revealed a lateral meniscal cyst. The knee locking was released suddenly 2 days preoperatively. The authors had attributed the missed diagnosis to an atypical history and symptoms and an associated meniscal cyst.

The purpose of this article is to help prevent misdiagnosis of atypical cyclops lesions. Cyclops lesions should be considered in the differential diagnosis of patients who present with gradual or sudden loss of extension after ACL reconstruction, regardless of how much time has passed postoperatively.

Figure: A large fibrous nodule of cyclops lesion (CL) in the intercondylar notch nearly occupied the whole space (A). The nodule (CL) had wide conjunctions with the body and femoral side (arrowhead) of anterior cruciate ligament (ACL) graft (G) and roof of the notch (arrow). Its connections with the anterior cruciate ligament graft were relatively loose (B). Abbreviations: LC, lateral femoral condyle; MC, medial femoral condyle; P, probe.
Cyclops lesions are well described complications after anterior cruciate ligament (ACL) reconstruction. In 1990, Jackson and Schaefer first reported that a cyclops lesion was a fibrous nodule with central granulation tissue. Patients with cyclops lesions commonly had gradual and persistent extension loss during the early postoperative course (usually several months) after ACL reconstruction. Magnetic resonance imaging (MRI) typically revealed a soft tissue nodule attached to the reconstructed ACL. This article describes a case of misdiagnosis of a cyclops lesion as a meniscal lesion combined with a meniscal cyst 4 years postoperatively.

CASE REPORT
A 25-year-old man presented with a 2-week history of left knee pain and locking in February 2011. The patient gave consent for this case to be reported. Approximately 4 years previously, he had undergone an arthroscopic single-bundle ACL reconstruction, which was performed by our medical group using hamstring tendon autograft with fixation of an EndoButton proximally and a Washer distally (Smith & Nephew Endoscopy, Mansfield, Massachusetts), along with a lateral partial meniscectomy due to an ACL injury sustained 2 years previously while playing football. Notchplasty was performed because a narrow notch was observed. No extension loss was observed pre- or postoperatively. Two months postoperatively, he regained full range of motion (ROM) and had no tenderness or effusion. He returned to sports and reported no traumatic event 6 months postoperatively.

Approximately 4 years postoperatively, his knee locked suddenly while descending stairs, and he reported severe pain with terminal extension. Two weeks after locking, physical examination revealed lateral joint line tenderness, a minor effusion, and approximately 20° of extension loss. Regardless, McMurray, anterior drawer, and Lachman tests did not apply.

During an attempt to gently extend the knee, he reported pain at the inferior pole of patella. Radiographs revealed that the EndoButton and Washer were in a good position. Magnetic resonance imaging revealed an intact ACL graft with no graft impingement (Figure 1A). A meniscal cyst existed immediately anterior to the anterior horn of lateral meniscus (Figures 1A, 1B). The patient underwent arthroscopy with a diagnosis of a lateral meniscal lesion, including a meniscal cyst. Three weeks after locking and 2 days postoperatively, the knee locking suddenly released. Examination revealed that lateral tenderness still existed, and the McMurray test was positive. The anterior drawer test and Lachman test were negative, and ROM was not limited.

The standard anterolateral and anteromedial portals were used to perform diagnostic arthroscopy. An approximately 12×10-mm meniscal cyst existed immediately anterior to the anterior horn of lateral meniscus. An approximately 20×25-mm large fibrous nodule in the intercondylar notch—occupying almost the entire anterior notch—was causing the knee locking (Figure 2A; Video 1). Impingement between the nodule and graft existed during knee extension. The nodule was consistent with a cyclops lesion and was broadly attached to the body and femoral end of the ACL graft, the roof of the intercondylar notch from the 8- to the 14-o’clock position (arrowhead), and the femoral end (F) of posterior cruciate ligament (C). Abbreviations: LC, lateral femoral condyle; MC, medial femoral condyle; P, probe.
was resected using basket forceps and an arthroscopic shaver, with preservation of the ACL graft and PCL fibers. The ACL graft was taut and stable (Figures 2B, C; Video 1). No impingement existed after debridement. The lateral meniscal cyst was removed, and a gap in the meniscosynovial junction after cyst removal was closed by 1 stitch using outside-in suture technique. Histologic finding of a nodule showed chronic inflammation proliferation and degeneration with disorganized fibroconnective tissue.

The patient was fully weight bearing and started ROM exercises <90° 1 week postoperatively. Four weeks postoperatively, knee flexion increase was allowed as tolerated. Ten weeks postoperatively, the patient returned to usual activities of daily living and had full, painless ROM.

**Discussion**

Focal arthrofibrosis is a common complication with a frequency of 1% to 9.8% after ACL reconstruction and is called a cyclops lesion because on arthroscopy it resembles a head with an area of discoloration that looks like an eye. It presents with a fibrous nodule anterior to the ACL graft and limits complete knee extension due to intercondylar notch impingement. Wang and Ao reported the common characteristics of different types of lesions: firmly attached to the graft; symptoms usually occurring within 3 months of ACL reconstruction; and having a similar histology. Sonnery-Cottet et al reported that 78.6% of cyclops lesions had extension loss within 6 weeks postoperatively, and that the diagnosis of 92.8% cases was established within 6 months postoperatively.

The current case differs from common cases. No extension loss existed for 4 years postoperatively. Before the second arthroscopy, the diagnosis of cyclops lesion was missed, even with the help of MRI. Nuccion et al also reported a symptomatic cyclops lesion 4 years after ACL reconstruction that presented with a gradual decrease in knee extension. Nuccion et al reported a patient who attended 53 physical therapy sessions from 1 week to 11 months postoperatively to regain full, painless knee ROM. However, in the current case, no extension loss was observed pre- or postoperatively until knee locking. The patient returned to usual activity and sports 2 and 6 months postoperatively, respectively. Moreover, his locking was released before the second surgery. The patient reported by Nuccion et al had more in common with typical cyclops lesion than the current case.

On MRI, a cyclops lesion is seen as a low-signal nodule on T1-weighted sequences and predominantly low signal on T2-weighted sequences just anterior to the distal end of the ACL graft. In the current study, the patient’s MRI showed a vaguely defined nodule of low signal (Figures 1A, C) on T2-weighted sequences, which was partially hidden by the high signal of a lateral meniscal cyst (Figures 1A, B). The meniscal cyst caused the authors to miss the diagnosis of cyclops lesion. Moreover, the vague nodule of low MRI signal was not just anterior to the ACL graft (Figure 1C). It coincided with the arthroscopic view that the nodule was partially mobile because its connections with surrounding structures were relatively loose (Figure 2B), possibly explaining why the knee was locking and released dramatically and no extension loss was observed for 4 years. Previous studies reported that some cyclops lesions were asymptomatic. In the current case, the nodule was not big enough and its surrounding connections were not taut enough to lock the knee 4 years postoperatively.

Cyclops lesions typically originate from the distal end of an ACL graft. Rubin et al published the first report in the literature in which a cyclops lesion arose directly from the femoral end of an ACL graft. The nodule in our case had no relation to the tibial tunnel or tibial end of the graft, and it had wide connections to surrounding structures, including the body and femoral end of ACL graft, the roof of the intercondylar notch, and the femoral end of the PCL (Figures 2B, 2C; Videos 1, 2). Sonnery-Cottet et al also reported that a cyclops lesion did not arise from the graft but was primarily connected to the roof of the notch and PCL synovium. Their study regarded it as specificity of the double-bundle ACL reconstruction.

**Table**

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Abbreviations: ACL, anterior cruciate ligament; PCL, posterior cruciate ligament.
However, a similar origin was observed after single-bundle ACL reconstruction in the current case. Compared with reports by Rubin\textsuperscript{5} and Sonnery-Cottet,\textsuperscript{4} the current case shows more apparent variation from the usual cyclops lesion.

The current case had similarities with typical cyclops lesion. The histologic findings of disorganized fibroconnective tissue were similar to other reports.\textsuperscript{2,3,10} The differences between typical cyclops lesions and our case are listed in the Table. The authors attributed the missed diagnosis of the current case to its atypical history, symptoms, and an associated lateral meniscal cyst.

**Conclusion**

The purpose of this article is to help prevent misdiagnosis of atypical cyclops lesions. Cyclops lesion should be considered in the differential diagnosis in patients who present with gradual or sudden extension loss, no matter how much time has passed postoperatively. Careful examination, MRI, and arthroscopic exploration are recommended for these patients.

**References**