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Dr. Sachin Khanduri
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Dr. Avani Kanojia
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Dr. Saddam Hussain
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Dr. Sajida Ansari
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Dr. Deole Yash Milind
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Corresponding Author:
Dr. Avani Kanojia
Era's Lucknow Medical College and Hospital, Era University, Lucknow, Uttar Pradesh, India

Cyclops lesion in a patient with anterior cruciate ligament tear repair: A case report

Sachin Khanduri, Avani Kanojia, Saddam Hussain, Sajida Ansari and Deole Yash Milind

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Abstract
A cyclops lesion is a localized form of anterior arthrofibrosis and is a common complication following anterior cruciate ligament (ACL) reconstruction. It manifests as a nodular mass of fibrous tissue that develops at the graft site in the anterior part of the knee, typically near the tibial tunnel. This lesion can hinder full knee extension, resulting in a "loss of extension" or creating a mechanical block that limits the range of motion. Studies indicate that cyclops lesions have a prevalence of 25% in patients who have undergone ACL reconstruction.

Keywords: Cyclops, anterior cruciate ligament tear, MRI, ACL reconstruction

Introduction
The cyclops lesion, also referred to as localized anterior arthrofibrosis, is a well-defined intra-articular nodule that can develop after anterior cruciate ligament (ACL) reconstruction. It is characterized by a pedunculated or non-pedunculated mass composed of fibrovascular tissue, which may contain cartilage, fibrous elements, or even bony fragments. This lesion derives its name from its distinctive arthroscopic appearance, where the presence of a central, raised, rounded nodule surrounded by overlying blood vessels creates a resemblance to the mythical cyclops. The most common location for a cyclops lesion is in the anterolateral aspect of the tibial insertion site of the ACL graft. This region is particularly susceptible to mechanical impingement due to its proximity to the intercondylar notch, which can lead to restricted knee extension and anterior knee pain. The lesion typically presents as a hypertrophic nodule or excessive granulation tissue in response to surgical trauma, leading to irritation and potential obstruction of normal knee motion. While the exact etiology remains multifactorial, contributing factors may include incomplete graft remodeling, excessive synovial reaction, residual debris from surgical drilling, or repeated microtrauma. Clinically, patients with a cyclops lesion may experience a painful mechanical block to full knee extension, which can be accompanied by crepitus or a clicking sensation. Diagnosis is often made using magnetic resonance imaging (MRI), which reveals a well-defined mass near the tibial tunnel, sometimes with low to intermediate signal intensity on T1- and T2-weighted images. Arthroscopic debridement remains the treatment of choice, offering symptomatic relief and restoration of knee.
This condition is often associated with a tibial tunnel that is positioned more anteriorly or with a disorganized mass of scar tissue in the anterior compartment. Importantly, the cyclops lesion is the second most common cause of restricted knee extension, following graft impingement. It has been observed in cases of both complete and partial tears of the native ACL. Most cyclops lesions are asymptomatic and are usually discovered incidentally during postoperative MRI scans.

Case Report
A 23-year-old male patient sustained an anterior cruciate ligament (ACL) tear while playing rugby and subsequently underwent ACL reconstruction surgery three weeks after the injury. His postoperative recovery was initially uneventful; however, approximately five months after the procedure, he began experiencing recurrent episodes of intermittent knee locking, along with persistent posterior knee pain. These symptoms gradually worsened, leading to

functional limitations that affected his daily activities and sports performance.

Upon clinical examination, the doctor noted tenderness over the knee joint, particularly in the anterior aspect. The patient also exhibited a restricted range of motion, primarily struggling with terminal knee extension. Despite rigorous rehabilitation efforts, he was unable to achieve full extension of the knee, suggesting a possible mechanical obstruction. A lateral radiograph of the knee joint was obtained to assess for any bony abnormalities, such as osteophyte formation, loose bodies, or tunnel malposition; however, the X-ray findings appeared unremarkable, providing no definitive explanation for the patient's symptoms.

Given the persistent extension deficit and mechanical symptoms, an MRI of the knee was ordered to further investigate potential intra-articular pathology. The MRI findings revealed an oval-shaped nodular mass located in the anterior intercondylar notch, adjacent to the reconstructed ACL graft. The lesion displayed mixed signal characteristics, with intermediate to high signal intensity on proton density (PD) fat-saturated MRI sequences, indicating the presence of fibrovascular or granulation tissue. Additionally, on standard PD sequences, the mass appeared isointense to muscle, further supporting the diagnosis of a cyclops lesion, also known as localized anterior arthrofibrosis. This lesion, composed of fibrous tissue, is known to develop in response to surgical trauma, leading to impingement and restricted motion.

In light of these findings, the patient was diagnosed with a cyclops lesion, which was responsible for his extension deficit and mechanical locking symptoms. Given the impact on knee function, arthroscopic intervention was recommended to excise the lesion and restore full range of motion. Postoperative rehabilitation, focusing on gradual extension exercises and soft tissue mobilization, would be crucial to prevent recurrence and optimize functional outcomes.

Fig 1: Sagittal PD MRI image of the knee demonstrating an oval-shaped nodular mass (red arrow

Fig 2: Coronal PD FS MRI image of the knee showing Cyclops lesion in the anterior intercondylar notch

Fig 3: Sagittal PD FS MRI image of localized anterior arthrofibrosis

Discussion

Cyclops lesions following ACL reconstruction can be categorized into two types. The first type, known as cyclops syndrome, is the classic form that leads to a loss of knee extension post-surgery [1]. The second type refers to a lesion detected during second-look arthroscopy after ACL reconstruction, without any associated loss of knee extension [2]. Symptomatic cyclops lesions occur in 0–2% of patients following ACL reconstruction and can be effectively treated with arthroscopic resection. Clinically, these lesions are characterized by a rubbery end point upon full extension, with or without a palpable pop, an initially full range of motion that later diminishes, and a rebound effect after forced extension. However, these signs can be inconsistent and unreliable. Since radiographs do not

visualize the affected soft tissue structures, we evaluated the usefulness of MRI in detecting cyclops lesions [3]. A greater incidence of cyclops lesion in female patients, as high as 4 times greater than that in their male counterparts, has been reported by various studies.

During arthroscopy, cyclops lesions have been classified based on their location: 44% occur near the tibial tunnel area, 27% just anterior to the reconstructed graft, 18% in front of the notch, and 20% between the tunnel and the graft. Notably, 80% of these cases are asymptomatic, while only 20% contribute to extension limitation. As a result, the overall incidence of symptomatic cyclops lesions is less than 5% [7].

Conclusion

Although cyclops lesions are not commonly found, they are the second most frequently reported cause of knee extension loss following ACL repairs. They can also contribute to knee pain and discomfort after cruciate ligament reconstruction. Therefore, they should be ruled out in patients experiencing persistent post-operative knee pain [4]. Once formed, the nodule can cause a mechanical block to terminal extension by becoming trapped between the tibia and femur. Cyclops lesions are treated through arthroscopic removal, with notchplasty performed if needed. The prognosis after excision is favorable, as symptoms typically resolve within a few weeks, allowing patients to regain full range of motion [5]. Cyclops lesions are a common complication following ACL reconstruction. It is crucial to differentiate between a cyclops lesion and cyclops syndrome, as treatment is only required for symptomatic cases. MRI is the preferred method for confirmatory diagnosis, and surgical excision is the treatment of choice for symptomatic lesions. The prognosis after excision is excellent, with recurrence being rare [6].

Conflict of Interest

Not available.

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