

CASE REPORT

Treatment of a Neglected and Infected Knee Dislocation with a Traction Pin: A Case Report

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Received: 30 June 2023

Accepted: 12 July 2023

Abstract

Neglected knee dislocations are rare and challenging orthopedic injuries. We report using a traction pin to treat a neglected knee dislocation and a concurrent infection. Following the primary reduction with extensive soft-tissue release, a proximal tibial traction pin was used to obtain complete reduction via traction weight change. No ligamentous repair was done for the patient. The patient's one-year follow-up showed an acceptable radiographic reduction supported by satisfactory clinical outcomes. In conclusion, the proximal tibial traction pin could be a good alternative for treating neglected knee dislocations. It makes future knee replacements more practical, a significant concern in such patients. Meanwhile, it is much more affordable than the other available techniques.

Level of evidence: V

Keywords: Chronic knee dislocation, Infection, Soft-tissue release, Traction pin

Introduction

P Traumatic knee dislocations are rare injuries, with an incidence of almost 0.02 of all extremity injuries.^{1,2} These injuries generally occur following high-energy accidents and are mainly addressed in their acute phase.³ Neglected knee dislocations are much rarer, so most orthopedic surgeons treat only one or two cases during their careers.⁴ For this reason, there is no consensus on the optimal treatment of neglected knee dislocation, and various therapies have been implemented, including the Ilizarov technique, Steinmann pin fixation, external fixation, arthrodesis, and total knee arthroplasty (TKA).^{5,6}

This report presents a neglected knee dislocation complicated by a concurrent infection adequately managed with open reduction and proximal tibial traction pins. Open reduction was made to make the future conversion to TKA practical, with the implementation of lower-constrained TKA and a lower risk of failure.

To the best of our knowledge, traction pins have not been used in any earlier studies to treat neglected knee dislocations.

Case Presentation

A 35-year-old male addict had a motor vehicle accident almost one year ago, resulting in his falling from a height of

1.5 meters. However, he did not seek medical care at that time. After six months, he was referred to a local hospital with severe swelling, pain, and redness. He underwent arthrotomy, irrigation, debridement, and antibiotic therapy following the diagnosis of right knee sepsis. Two months later, he was referred to our center with severe pain and an inability to move his knee [Figure 1a]. In the physical examination, the knee was fixed at 30° flexion. Radiographic evaluation was consistent with the diagnosis of an old posterolateral knee dislocation [Figures 1b and c].

The patient underwent open reduction, with irrigation and debridement, fibrosis removal, and extensive soft-tissue release (accurate harvest from their bone attachment), including the release of medial and lateral structures and the hamstring. Intraoperatively, the articular cartilage was destroyed up to the cancellous bone [Figure 1d]. In the medial structures, the semimembranous, superficial, and deep medial collateral ligament and posteromedial capsule were released from their tibial side. In the lateral structures, the lateral gutter, posterolateral capsule, lateral head of gastrocnemius, arcuate ligament, and lateral collateral ligament were released from their femoral attachments.

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Popliteus was not manipulated, and the iliotibial band was cut. No ligamentous reconstruction was performed. Neurovascular assessment in postoperative examinations revealed no compromise, impaired blood flow, or damage to the peripheral nerves.



Figure 1. (a) Preoperative photograph of the patient's knee; (b and c) Preoperative anteroposterior and lateral radiographs of the knee; (d) Intraoperative photograph showing the articular cartilage destruction

Despite our extensive soft-tissue release, the complete reduction was not achieved due to the old dislocation. Therefore, we decided to manage the residual subluxation with a proximal tibial traction pin that was inserted and kept in place for three weeks. During these three weeks, the patient was hospitalized for antibiotic therapy and to manage reduction by traction change in the coronal and sagittal planes. Serial radiographs were obtained for appropriate reduction through coronal and sagittal traction weight adjustment [Figure 2]. The intravenous antibiotic injection was also administered for the treatment of septic knee arthritis, according to the results of the culture and antibiogram. After three weeks, the pin was extracted, and the knee was fixed in a long leg cast for an extra three weeks. Subsequently, the knee range of motion (ROM) was initialized.



Figure 2. Postoperative lateral radiographs: (a) Immediately after traction pin placement; (b) Three weeks after traction pin placement

The follow-up visits were performed two weeks, six weeks, three months, six months, and one year after the discharge. One year after treatment, the patient could walk without a cane. He had slight pain (Visual Analog Scale=4) with full knee extension and about 50° of flexion. The postoperative radiographs showed an acceptable reduction of knee dislocation [Figure 3]. the patient was informed that data

concerning the case would be submitted for publication, and the patient agreed.

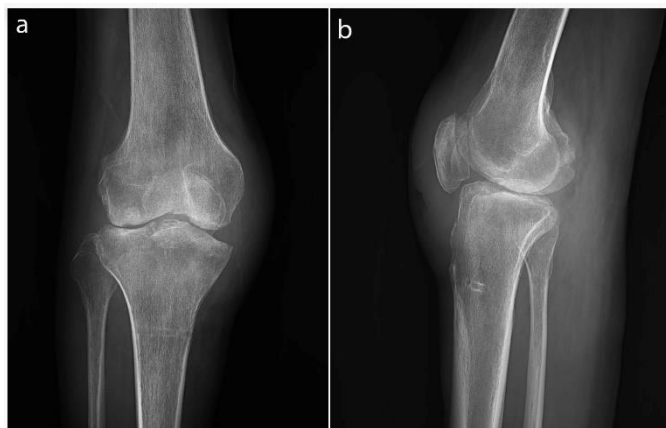


Figure 3. Anteroposterior (a) and lateral (b) radiographs of the knee one year after the operation

Discussion

Due to its rare presentation, there is no consensus on the best surgical treatment for old knee dislocations. While several surgical options, ranging from an open reduction to arthrodesis and TKA, are being used, the evidence is insufficient to support their superiority. Situations such as a long-term interval between the injury and surgery and a concurrent infection could make treating these injuries even more complicated. Therefore, developing new techniques and sharing the results with other surgeons is essential, particularly when dealing with complex cases.

In earlier studies, open reduction and external fixation were the most commonly used treatment methods for old knee dislocations, providing adequate stability and mobility. If a hinged model is used, early ROM is also achievable, reducing the risk of failure following the reconstruction.^{7,8} The Ilizarov method has also been shown to be an efficient treatment for reducing old and severe knee dislocations. It allows gradual correction and soft-tissue adaptation and is associated with negligible damage and devascularization. Its modified frame also allows the start of physical therapy concurrently.⁹ Arthroplasty and arthrodesis are conventional treatments for neglected knee dislocations. While TKA provides satisfactory results in patients with an old knee dislocation, it is considered a challenging procedure, and quadriceps release and the use of constrained prostheses are recommended.¹⁰

Other surgical methods, including Steinmann, pin fixation, and staged release with soft-tissue reconstruction, have also been sparsely used to treat neglected knee dislocations.^{11,12} Whatever technique is implemented, reducing old knee dislocations is always a dilemma and is associated with various challenges, such as choosing the most appropriate approach, deciding on the extent of the soft-tissue release and ligamentous reconstruction, and selecting the postoperative rehabilitation protocol.⁷ These decisions should be made case by case, as each injury has its own

specific pattern that differs from other neglected cases of knee dislocation in several aspects, such as the level of deformity, the preoperative knee ROM, soft-tissue damage, and atrophy. The time interval between the injury and surgery also plays a vital role in the outcomes of neglected knee dislocation, as a longer period of dislocation is associated with more contractures and thus a worse outcome.⁸

In this report, we presented a new technique for treating neglected knee dislocation, which included open reduction and extensive soft-tissue release, followed by the placement of proximal tibial traction pins to gradually reduce the dislocation. Open removal was conducted to make the future conversion to TKA more practical. If traction was performed without open reduction, it would be impossible to convert to TKA. The one-year follow-up of the patient revealed satisfying outcomes, suggesting this technique is a promising substitute for the already available techniques. In addition to providing acceptable outcomes, the proposed technique is much less expensive than other fixation devices, such as the Ilizarov apparatus or external fixators. Even so, the effectiveness of this method compared to other methods should be investigated in future studies.

Conclusion

Open reduction and extensive soft-tissue release, followed by the placement of proximal tibial traction pins for the gradual reduction of the remaining dislocation, could be regarded as a practical approach for managing complicated old knee dislocations. It also makes the future conversion to TKA more practical, which is a significant concern for such patients. Moreover, it is much more affordable than the other available techniques.

Acknowledgement

Not applicable

Conflict of interest: None

Funding: None

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