

## Case Report

# Treatment of Old Knee Dislocation With Open Reduction and Proximal Tibial Traction Pin: A Case Report



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**Citation** Yahyazadeh H, Jabalameli M, Kassir H. Treatment of Old Knee Dislocation With Open Reduction and Proximal Tibial Traction Pin: A Case Report. *Journal of Research in Orthopedic Science*. 2022; 9(3):181-186. <http://dx.doi.org/10.32598/JROSJ.9.3.1030.1>

<http://dx.doi.org/10.32598/JROSJ.9.3.1030.1>

### Article info:

**Received:** 16 May 2022

**Revised:** 26 May 2022

**Accepted:** 17 Apr 2022

**Available Online:** 01 August 2022

### Keywords:

Old knee dislocation, Soft-tissue release, Traction pin

## ABSTRACT

Neglected knee dislocations are rare. There is no agreement on the best treatment for these injuries. In this report, we present a case of old knee dislocation treated with open reduction and proximal tibial traction pin. After open reduction and extensive soft-tissue release, the complete reduction was not achieved. Therefore, we used a proximal tibial traction pin to gradually obtain a complete reduction via traction weight change. We did no ligamentous repair. One year after the operation, the patient had an acceptable radiographic reduction and satisfactory clinical outcomes. We recommend the proximal tibial traction pin as a valuable alternative in the treatment of neglected knee dislocation. In addition to its promising outcomes, the traction pin is much less expensive than the already-used devices. Moreover, the introduced procedure makes the future conversion to total knee arthroplasty (TKA) more feasible, which is considered a significant concern in such patients.

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## 1. Introduction

**T**raumatic knee dislocations are uncommon injuries with profound consequences, if not appropriately addressed in the acute phase [1]. Neglected knee dislocations are rare and for this reason, there is no agreement on the treatment of choice for these injuries. Although various surgeries, including the Ilizarov technique, pin fixation, arthrodesis, external fixation, and total knee arthroplasty (TKA), have been used for the treatment of neglected knee dislocations, it is unclear which procedure results in the best possible outcomes [2].

One of the critical aspects in the treatment of neglected knee dislocation is the consideration of the possible conversion to TKA in the future and providing conditions to make this conversion more practical and effective. The open reduction makes the future conversion to TKA more feasible and allows using less-constrained TKA with a smaller risk of failure [3].

In this report, we present a case of neglected knee dislocation that was adequately managed with open reduction and proximal tibial traction pins.

## 2. Case Presentation

A 39-year-old male was referred to our specialized orthopedic center with left knee pain, deformity, and inability to walk. The patient reported a car-to-motor accident almost three months earlier, causing multiple trauma injuries, including a knee dislocation that was managed with open reduction and external fixation in another center. The fixator was removed after three weeks.

In the physical examination, the patient had a limited knee range of motion (from full extension up to 30° of flexion) with no active extension. In the radiographic examination, the posterolateral rotatory dislocation of the left knee was detected (Figures 1a and b). The knee magnetic resonance imaging showed multiple ligamentous injuries (Figure 1c). The ankle-brachial index was normal. The doppler sonography and coronary computed tomography angiography were conducted to evaluate the blood vessels, which were confirmed to be normal (Figure 1d).

The patients underwent open reduction with fibrosis removal and extensive soft-tissue release (accurate harvest from their bone attachment). The release of medial structures included the release of semimembranous, su-

perficial, and deep medial collateral ligament and posteromedial capsule from their tibial side. The release of lateral structures included the release of the lateral gutter, posterolateral capsule, lateral head of gastrocnemius, arcuate ligament, and lateral collateral ligament from their femoral attachment. No manipulation was done for popliteus. The iliotibial band was cut. Meanwhile, ligamentous reconstruction was not performed. Postoperative neurovascular examination revealed no impairment in the blood flow and peripheral nerves.

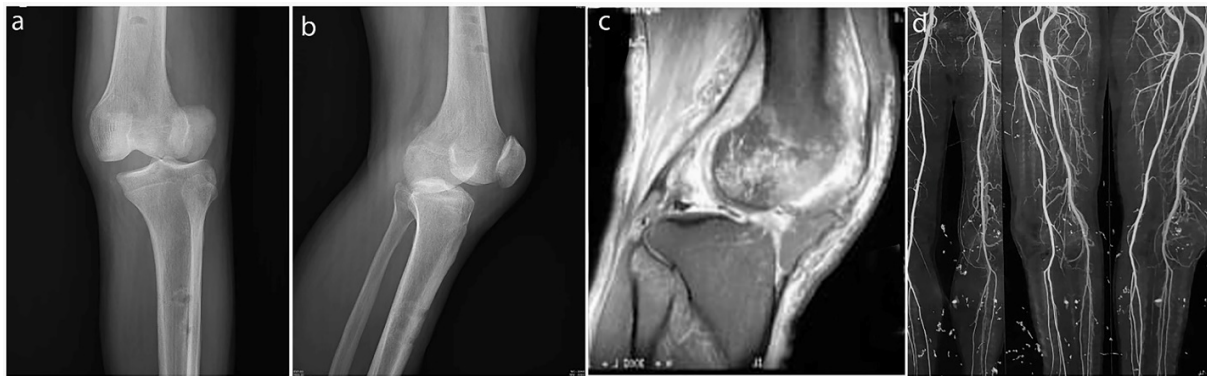
Because of the old nature of dislocation, complete reduction was not achieved even after extensive soft-tissue release, and a proximal tibial traction pin was implemented to manage residual subluxation in both coronal and sagittal planes (Figure 2). The pin was kept in place for three weeks while the patient was hospitalized during this period (Figure 3). The reduction was checked by serial radiography, and the required traction was provided by the change of traction weight. This process was continued until the appropriate reduction was obtained in both the coronal and sagittal planes. After that, the pin was extracted, and a long leg cast was implemented at 90° knee flexion for three weeks. The knee range of motion was started afterward. However, due to the limited knee range of motion, the patient underwent manipulation under anesthesia after six weeks.

The patient follow-up visits were performed in two weeks, six weeks, three months, six months, and one year after the discharge. One year after the treatment, the patient had full knee extension and 100° flexion with slight pain (visual analog scale=2). The patient could withstand the full weight bearing without a cane. Meanwhile, the patient could also run up and down the stairs. Radiographic evaluation was promising (Figure 4).

## 3. Discussion

Open reduction and external fixation (OREF) is the most frequently used treatment for neglected knee dislocations. It provides appropriate stability. In addition, an early knee range of movements is achievable if a hinged model is used. Moreover, OREF reduces the risk of failure after reconstruction [4, 5]. In the present report, we did not use OREF because the patient was managed with OREF in the acute phase, and proper reduction was not achieved.

Arthroplasty is a conventional treatment for neglected knee dislocation, and it provides satisfactory results in patients with a neglected knee dislocation. However, it is a challenging procedure in these patients, which requires



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**Figure 1.** a) and b) Preoperative anteroposterior and lateral radiographs showing the posterolateral rotatory dislocation of the left knee, c) Preoperative MRI showing multiple soft-tissue injuries, d) Coronal computed tomography angiography showing the normal blood vessels and blood flow

quadriceps release and the use of constrained prostheses [6]. Therefore, the development of less challenging procedures for the treatment of old knee dislocations is valuable.

In this report, we used open reduction and proximal tibial traction pin for gradual reduction of the dislocation. Open reduction and extensive soft-tissue release were conducted to make the future conversion to TKA more feasible because traction without open reduction makes the future conversion to TKA impossible. Satisfying outcomes of the patients suggest that this technique is a promising substitute for the other available surgi-

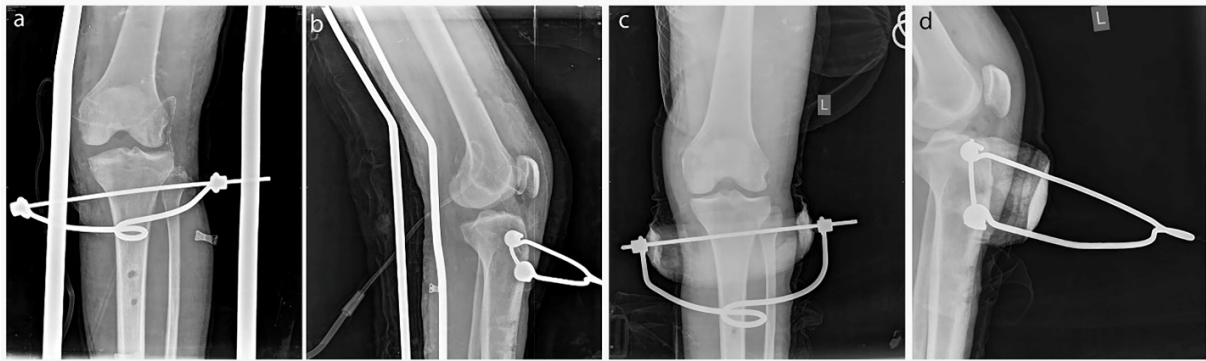
cal methods. Moreover, fixation with a proximal tibial traction pin is much less expensive than other fixation devices, such as the external fixators or Ilizarov apparatus, making it a more viable option for developing and underdeveloped countries.

Traction pins were primarily developed for the management of fractures and dislocations. However, the use of traction pins for the management of old knee dislocation has not been reported in the literature. However, the insertion of traction pins and care of these pins until achieving proper reduction is challenging and can be accompanied by serious complications, including neu-



**Figure 2.** Managing the residual subluxation with proximal tibial traction pin

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**Figure 3.** a) and b) Anteroposterior and lateral radiographs of the knee immediately after the placement of traction pin, c) and d) Anteroposterior and lateral radiographs three weeks after the placement of traction pin



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**Figure 4.** Anteroposterior (a) and lateral (b) radiographs of the knee six months after the extraction of the traction pin

rovascular damage, physical injury, ligamentous insult, and infection [7]. Therefore, we suggest performing this procedure by experienced orthopedic surgeons.

#### 4. Conclusion

Open reduction and proximal tibial traction pin could be used as a promising substitute to the available surgical methods for the treatment of an old knee dislocation. In addition to providing acceptable limb function, using

this procedure makes the future conversion to TKA more feasible.

#### Ethical Considerations

##### Compliance with ethical guidelines

This study was performed according to the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. There is no information (names, initials, hospital identification numbers, or photographs)

in the submitted manuscript that can be used to identify patients.

### Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

### Authors' contributions

All authors equally contributed to preparing all parts of the research.

### Conflict of interest

The authors declared no conflict of interest.

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