



Screw loosening and iliotibial band friction after posterolateral corner reconstruction



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ABSTRACT

Background: Many reconstruction techniques have already been developed for treating posterolateral corner (PLC) injuries, with still no consensus regarding what would be the best option. Some techniques use non-bone tunnel fixation, attaching the graft to the femur using a cortical screw with toothed washer. The main objective of the present study is to evaluate complications related to fixation performed by a screw and toothed washer technique.

Methods: A prospective study with surgical reconstruction of the PLC structures of the knee between January 2008 and December 2009 was performed. PLC reconstruction included reconstruction of the lateral collateral ligament, popliteofibular ligament and popliteal muscle tendon. Fixation of the grafts in the femur was achieved by means of a 4.5 mm screw with a toothed washer. The assessments were done using the following methods: objective IKDC, subjective IKDC, Lysholm and Tegner. Radiographic evaluations were performed immediately after the operation, at 3, 6 and 12 months after surgery, and yearly thereafter. Complications were documented.

Results: The mean subjective IKDC score after the operation was 69.2; Lysholm scale was 80.7. Two patients presented failure of reconstructions of the PLC. In the radiographic evaluations, signs of loosening of the screw with toothed washer in the femur were observed in eight cases (66.6%). Six patients (50%) complained of lateral pain after the operation.

Conclusion: The technique of femoral fixation was shown to be efficient in restoration of stability. However there was a high rate of complications secondary to implant, such as loosening of the screws and iliotibial tract friction.

Level of evidence: Case series, Level IV.

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1. Introduction

Injuries of the posterolateral corner (PLC) are uncommon in comparison with injuries of other knee ligaments. The PLC is characterized anatomically by the lateral collateral ligament, tendon of the popliteal muscle, popliteofibular ligament and posterolateral capsule [1]. These injuries have an incidence of approximately 16%, of knee ligament injuries [2] and are often associated with injuries to the anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL). PLC injuries alone are very rare and account for less than 2% of the cases. They may fail to be diagnosed in their initial presentation in up to 70% of the cases [3–7].

These injuries usually occur through high-energy trauma, such as automotive vehicle accidents, sports trauma and falls. The commonest injury mechanism results from a hyperextension force on the knee, although such injuries may also occur through varus force, direct trauma to the anteromedial region of the knee or external rotation of the tibia [6,8–10].

Many reconstruction techniques have already been developed for treating injuries of the posterolateral complex. Today, anatomical reconstruction techniques show results that are superior to those from non-anatomical techniques. Among the techniques considered to be anatomical, there is still no consensus regarding what would be the best option, although the reconstruction techniques have shown results superior to those of repair techniques [11–15].

There is also divergence in the current literature regarding the structures to be reconstructed. Recent studies have shown good results with separate reconstructions of the lateral collateral ligament (LCL) and the popliteofibular ligament (PFL), without reconstruction of the tendon of the popliteal muscle (TPM) [16]. Although some authors share this opinion, most of the techniques recommend reconstruction of the three structures of the posterolateral complex, as recommended by LaPrade et al. [17–20].

Graft fixation in the femoral bone tunnels may be obtained by aperture fixation (i.e. interference screws) or cortical suspensory fixation (i.e. Endobutton plate). However, for non-bone tunnel fixation, graft may be attached to the femur using a screw with toothed washer [13–16].

Several complications related to the surgical procedure have already been described, such as graft failure, loss of range of motion, nerve

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injury, bone tunnel confluence, and surgical site infection. Regarding the graft fixation methods there are very few reports and we did not find any report particularly describing complications with screw and toothed washer fixation technique [12,14,16].

The main objective of the present study is to evaluate complications related to fixation of the structures of the posterolateral corner performed by screw and toothed washer technique. Secondly, the aim was to evaluate the postoperative functional scores and range of motion achieved through this type of reconstruction.

2. Materials and methods

We have conducted a prospective study with surgical reconstruction of the posterolateral corner of the knee between January 2008 and December 2009.

All patients with lateral injuries, with or without associated ACL, PCL or medial collateral ligament (MCL) injuries, were included. Patients who underwent vascular repair due to injuries of the popliteal artery or fractures in the region of the knee associated with the ligament injuries were excluded, as were patients who were lost during follow-up.

We graded the ligament injuries in accordance with the Schenck classification [21]:

KDI: injury to only one cruciate ligament (ACL or PCL) and/or collateral ligaments

KDII: ACL and PCL injured, with both collateral ligaments intact

KDIIM: ACL, PCL and MCL broken; lateral ligaments intact

KDIIL: ACL, PCL and lateral ligaments broken; MCL intact

KDIV: ACL, PCL, MCL and lateral ligaments broken

KDV: ligament injury associated with periarticular fracture

Surgeries were performed on-demand as patients presented for treatment in our hospital, such that there was no distinction in terms of technique or evaluation between the acute and chronic presentations. Surgical procedure was performed only after patients obtained a complete range of knee motion.

All the patients were asked about their activity level during the period immediately prior to the injury, using the Tegner scale, and were evaluated using the objective IKDC scale, by means of a physical examination under anesthesia immediately before the surgical procedure [22, 23].

The technique chosen for PLC reconstruction was as recommended by Stannard et al., with reconstruction of the LCL, PFL and TPM. For all the reconstructions, grafts from tissue banks were used: these grafts comprised anterior tibial, posterior tibial or semitendinosus tendons. A minimum length of 24 cm was needed for the reconstruction [14].

Fixation in the femur was achieved by means of a 4.5 mm screw with a toothed washer, which was placed at the isometric point of the lateral condyle, as described by Stannard et al. The graft was put in place around this (Fig. 1). Interference screws were used in the tibia as an aperture graft fixation technique that was used to reconstruct the TPM, and in the fibula to reconstruct the LCL [13,14].

The rehabilitation protocol was individualized by the combined central-pivot ligament injury. Patients with associated PCL injuries were fitted with a long knee immobilizer and allowed to non-weight bearing walk for 3 weeks. Passive range-of-motion exercises were performed under physiotherapist supervision. After this period, walking with partial weight-bearing, with the aid of crutches was allowed, and the immobilization was removed. Patients with associated ACL injuries were left without immobilization, with partial weight-bearing as tolerated, beginning on the first postoperative day.

The range of motion of the knee was assessed at 1, 2, 3, 6, 12 and 24 months after the operation. The assessments were done using the following methods: objective IKDC, which grades seven fields relating to the knee and classifies patients as A,B,C or D, i.e. normal, close to normal, abnormal and severely abnormal, respectively; subjective IKDC,

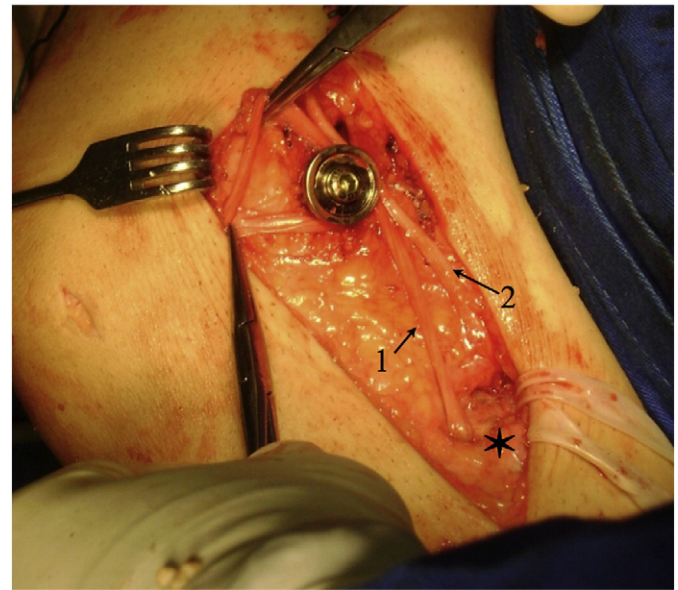


Fig. 1. Lateral view of the posterolateral corner reconstruction with femoral fixation using screw with toothed washer. 1. Lateral collateral ligament reconstruction 2. Popliteus tendon muscle reconstruction. *Fibular head.

which evaluates symptoms, sports activity, abilities and function, with scores ranging from 0 to 100 points; Lysholm, which is a scale for specific evaluation of knee symptoms, with a range from 0 to 100 points, composed of eight questions; and Tegner, which is a scale comparing activity levels from before to after the injury, ranging from 0 to 10 and covering activities going from activities of daily living to competitive sports, done at the most recent assessment on the patients.

Radiographic evaluations of the knee in the anteroposterior and lateral views were performed immediately after the operation, at 3, 6 and 12 months after surgery, and yearly thereafter. Radiographic alterations such as implant migration or radiolucency around the screws were documented.

Complications related to the surgical treatment or rehabilitation were also documented during follow-up.

3. Results

Fifteen patients with injuries to the structures of the posterolateral corner of the knee were initially included. Of these, 14 were male and one was female. Among these patients, two men and the only woman were excluded from the study because they were lost from the outpatient follow-up.

The mean age of the remaining 12 patients was 29.1 ± 6.6 years (ranging from 20 to 41 years). In relation to the trauma mechanism, eight patients suffered falls from motorcycles, two fell from a height, one was injured while playing soccer and one while doing martial arts. The reconstructions were performed on average 3.6 ± 1.9 months after the injury (ranging from 14 days to 6 months). The mean follow up time was 57.4 ± 5.5 months with a minimum of 48 months and a maximum of 66 months.

Table 1
Patients data.

Patient number	Age	Trauma mechanism	Ligament injury—Schenck classification
1	35	Motorcycle accident	III L
2	35	Motorcycle accident	III L
3	19	High height fall	IV
4	27	Motorcycle accident	IV
5	26	Motorcycle accident	III L
6	27	Motorcycle accident	III L
7	39	Motorcycle accident	III L
8	36	Motorcycle accident	III L
9	28	Motorcycle accident	III L
10	30	High height fall	III L
11	31	Sports (soccer)	IV
12	17	Sports (Brazilian Jiu-jitsu)	IV

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