

# A Study of Functional Outcomes of Anatomical Posterolateral Corner Reconstruction for the Treatment of Posterolateral Instability of the Knee Joint: Minimum 6 Month Follow Up

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**Abstract:** Introduction: A number of studies in recent years have led to a heightened understanding of the PLC, and biomechanically validated reconstruction techniques. Postero-lateral corner injuries are commonly associated with ACL or PCL tears, with only 28% of all PLC injuries occurring in isolation. The aim of the study is to assess whether or not the patient regains pre-injury level of physical activity and if so then the time required for the same along with functional results, complications and overall outcomes of anatomical postero-lateral complex reconstruction. Materials and Methods: There were total 15 patients included in this study after defining careful inclusion and exclusion criteria and PLC injury was classified according to modified Hungston classification, it was managed with modified La Prade technique. Patients were kept on regular follow up and were assessed based on IKDC score, knee society score, Lysholm knee score and lateral opening on varus stress view radiograph with each follow-up. Results: According to International Knee Documentation Committee, the mean pre-operative subjective score was 43.33 while the mean post-operative score was 86.53. In our study, referring to Knee Society Score, 10 (66.66%) patients had excellent functional outcome with return to normal routine activity, while 5 (33.33%) patients had good clinical and functional outcome with 14 (93.33%) having no complications post-operatively and 1(6.66%) patient having infection at the operated site upon follow up. Conclusion: PLC injuries which were operated with Modified La Prade technique in our study, patients showed improved alignment and no evidence of any residual pain in the affected lower extremity or any abnormal gait following operation and completing post-operative rehabilitation.

**Keywords:** posterolateral corner, varus stress view, anterior cruciate ligament, posterior cruciate ligament

## 1. Introduction

The postero-lateral corner was once referred to as the dark side of the knee because of limited understanding of the structures, biomechanics and possible treatment options. Postero-lateral corner injuries are commonly associated with ACL or PCL tears, with only 28% of all PLC injuries occurring in isolation. Failing to identify PLC injury may compromise concurrent cruciate ligament reconstructions and could furthermore derive in altered knee biomechanics, which ultimately can lead to early degenerative changes of the joint. The main anatomic structures of the postero-lateral aspect of the knee are the lateral (fibular) collateral ligament, the popliteus tendon and the popliteofibular ligament.

In order to identify PLC injuries a detailed physical examination should be performed. Likewise a comprehensive review of radiographic and magnetic resonance imaging studies are helpful to better determine the injured structures precisely. Poor outcomes have been reported for grade III PLC injuries treated non-operatively (resulting in varus and rotational instability of the knee) and thus, a reconstruction is indicated.

Complete PLC lesions rarely heal with non operative treatment, and are therefore most often treated surgically.

The purpose of this study was to review functional and clinical outcome of PLC reconstruction using Modified La Prade's operating technique.

## 2. Materials and Method

This retrospective study of 15 patients was conducted from 2018-2021 at a tertiary care center, M P Shah medical college, Jamnagar. All patients with Grade-III postero-lateral corner injury and associated ligament injuries were operated with modified La Prade technique. All patients in an age group of 18 to 90 years, who were fit for surgery, were included. Patients with isolated PLC injury and associated other intra- and extra- articular ligaments' injuries were included and operated. Patients excluded from this study presented with other associated injuries like osteochondral defect requiring drilling or mosaicplasty, vascular or nerve injuries.

Patients studied had PLC injury which was proven clinically and radiologically on admission and informing them about need for operative management and post-operative rehabilitation. Strength and range of movement of knee joint were measured and documented prior to surgery. The patients were asked for follow up for stress radiograph of knee with minimum follow up of 6 months and maximum follow up of 39 months.

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### 3. Surgical Techniques

All the patients were operated for PLC reconstruction on simple table under spinal/epidural anesthesia in supine position. A bolster was kept under the knee to maintain 15° flexion of knee. All patients were operated under proximal thigh tourniquet control and a negative suction was used in all patients. All the patients were operated by Modified La Prade technique. After surgical exposure of PLC and after making appropriate size tunnels in fibula, tibia and femur and after obtaining appropriate graft size and thickness, Semitendinosus, gracilis graft or peroneus graft was taken from another incision and prepared. Per-operatively after reconstruction of PLC injury, stability of affected knee joint was checked. All patients were given intravenous antibiotics and analgesics with fluid support postoperatively and immediate immobilization postoperatively in the form of AK-BK Brace.

Knee mobilization and Quadriceps strengthening exercise were started on 3<sup>rd</sup> post operative day. Partial weight bearing was started with walker and brace support on 5<sup>th</sup> post operative day. Postoperative patients were kept on regular follow up and during every follow up a thorough clinical evaluation were done for any complications, severity of pain, healing of wound, knee range of motion. All patients were subjected to post operative antero-posterior and lateral radiographs to determine the tunnel placement and position of endobutton and interference screw. Patients were followed up at 6weeks, 3 months, 6 months, and 1 yr and functional outcomes were assessed.

### 4. Results

This study of 15 patients assessed the functional, clinical and outcomes of postero-lateral corner injury reconstruction. In our study the most common mode of injury was road traffic accident followed by twisting injury.

In our study, an average age of 33 years were included in the study with, minimum age 20 years and maximum age 42 years. Male predominance was found in our study with 11(73.33%) male patient and 4(26.66%) female patient. Right knee was involved in 9(60.00%) patients and left knee was involved in 6 (40.00%) involvement was more on right knee common as compared to left knee. The mean pre-operative subjective IKDC score was 43.33 while the mean post-operative IKDC score was 86.53. There was significant improvement in post-operative IKDC score with comparison to pre-operative IKDC score.

Table 1: IKDC Score

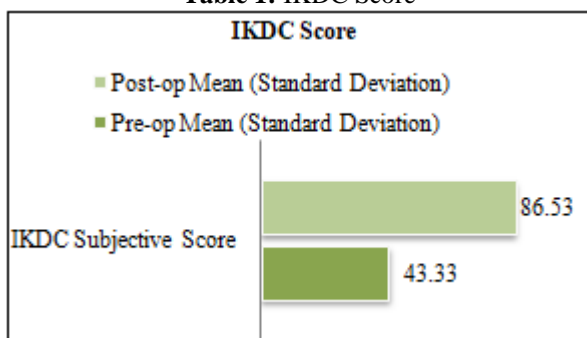
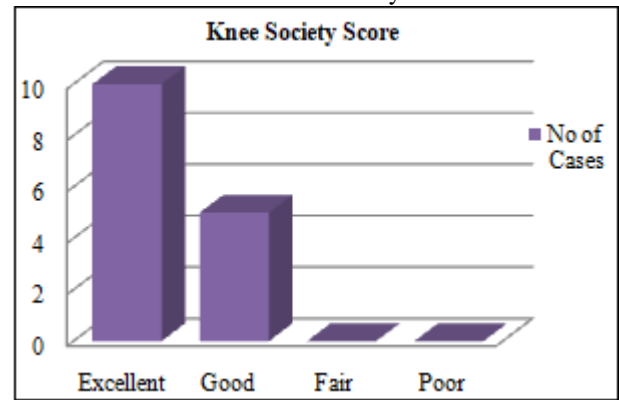


Table 2: Knee Society Score



In our study, 10 (66.66%) patients had excellent functional outcome with return to normal routine activity, while 5 (33.33%) patients had good clinical and functional outcome according to the Knee Society scoring system.

Table 3: Post-Operative Level of Work

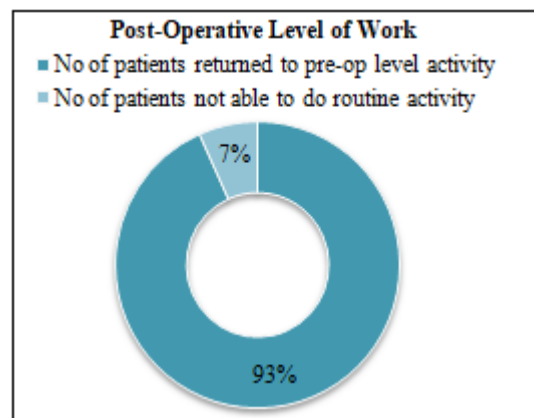


Table 3: Post-Operative Level of Work

Among 15 patients studied, 14 (93%) patients were able to return to their pre-operative level of routine household activities while 1 (7%) patient was not able to return to their pre-operative level but was able to do routine household work.

Table 4: Difference of lateral opening (mm) on varus stress view between pre-operative and post-operative affected knee

Difference (mm)	No. of Patients
<5	1
5-7	9
7-9	4
>9	1

In our study comparing the varus stress radiograph of pre and post-operative patients there was significant improvement and maximum patients had excellent results.

### 5. Discussion

Injuries to the postero-lateral corner (PLC) comprise a significant portion of knee ligament injuries. A high index of suspicion is necessary when evaluating the injured knee to detect these sometimes occult injuries. Moreover, a thorough physical examination and a comprehensive review of radiographic studies are necessary to identify these injuries. In this sense, stress radiographs can help to objectively determine the extent of these injuries.

Complete PLC lesions rarely heal with non-operative treatment, and are therefore most often treated surgically. Our study was to evaluate the functional and anatomical outcome of postero-lateral corner reconstruction using autografts, although outcome of PLC reconstruction studied for the Indian population is very few.

The PLC structures provide the primary restraint to varus forces of the knee and also postero-lateral rotation of the tibia.

The usual mechanism of injury of the postero-lateral corner involves a component of contact or noncontact twisting, hyperextension, or varus force due to athletic injuries, falls, or motor vehicle accidents. In our study the most common mode of injury was road traffic accident followed by twisting injury.

In this study, only 28% of these injuries were isolated grade 3 postero-lateral corner knee injuries, with the remainder occurring in combination with other knee ligament injuries.

Total 15 patients with an average age of 33 years were included in the study with, minimum age 20 years and maximum age 42years. Male predominance was found in our study with right knee involvement more as compared to left knee.

The commonly used direct fixation devices are interferences screw and staples. In our study, we used interference screws and endobutton. Autografts used were semitendinosus, gracilis and peroneus longus.

The mean pre-operative IKDC score in the study by Franciozi et al was 36.7; by Geeslin et al were 29.1, whereas post-operative score was 70.4, 81.5 respectively.

LaPrade et al in their study (2010) of 64 patients operated for postero-lateral reconstruction reported one post-operative infection at two months requiring revision of surgery. In present study, out of 15 patients, 1 patient reported with post-operative site infection which was treated with wound debridement and intravenous antibiotics.

LaPrade et al in their study (2008) concluded that in the intact knee, the mean lateral compartment gaping and a clinician-applied varus stress was 8.9 and 9.7 mm, respectively. Lateral gaping significantly increased by 3.4 and 4.0mm in knee with postero-lateral corner injury. In our study comparing the varus stress radiograph of affected limb between pre and post-operative patients there was significant improvement and maximum patients had excellent results with 9 patients having difference 5-7mm, 4 patients having difference of 7-9mm and 1 patients having difference <5 and 1 patient having difference of > 9 mm.

In our study there was comparison of radiograph of pre-operative varus stress view between unaffected and affected limb to see if any patient had inherent varus laxity or not. and in the study there was 6 patients with opening <6mm and 4 patients with opening between 7-8 mm followed by 5 patients with opening of more than 9mm.

## 6. Conclusion

In reference to the Modified Hughston Classification used for classifying Grade III [ $> 10$  mm of lateral opening on varus stress] PLC injuries which were operated with Modified La Prade technique in our study, 14 (93%) patients were able to return to their pre-operative level of activities while 1 (7%) patient was not able to return to their pre-operative activities but was able to do his routine household work. Patients showed improved alignment and no evidence of any residual pain in the affected lower extremity or any abnormal gait following operation and completing post-operative rehabilitation. Varus stress radiographs appear to provide an objective and reproducible measure of lateral compartment gapping that should prove useful for the diagnosis, management, and postoperative follow-up of patients with postero-lateral knee injuries.



**Figure 1:** Show Post-operative radiograph of patient at 6 month follow up.



**Figure 2:** Shows 6 month postoperative range of motion of right knee

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