

Medial Patellofemoral Ligament Reconstruction using Semitendinosus and Gracilis Autograft with Anteromedialization of Tibial Tuberosity for Recurrent Patellar Instability: A Case Report

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Abstract

Case Report

Medial patellofemoral ligament reconstruction is used to treat a substantial and recurring dislocation of the knee cap. Recurrent patellar instability is common in children, teenagers and young adult. A 20-year-old female presented with a five-year history of left knee pain. The clinical examination reveals that apprehension test is positive; there is pain and muscle defensive contraction of lateral patellar dislocation with knee flexion of 20°-30°. The X-ray shows a double contour sign, crossing sign, laterally tilted patella with flattened trochlear joint surface. The patient underwent medial patellofemoral ligament reconstruction using semitendinosus and gracilis tendon autograft with anteromedialization of tibial tuberosity. The patient is able to resume normal daily activities without complaint following the operation.

Keywords: Recurrent patellar instability, knee pain, medial patellofemoral ligament reconstruction, patellar dislocation.

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INTRODUCTION

Orthopedic surgeons often struggle with the patellofemoral joint of patients who often sublux or dislocate it. To address many causes of unstable patellofemoral joints, such as the presence of (i) genu valgum, (ii) hyperlaxity, (iii) under development of the lateral femoral condyle and flattening of the intercondylar groove (iv) maldevelopment of patella, which may be too high or too small, (v) patellar dysplasia, (vi) external tibial torsion, (vii) a primary muscle defect, extensive surgical training is necessary. These procedures include femoral osteotomy and arthroscopy [1-3]. The medial patellofemoral ligament (MPFL) is an essential part of the knee joint that stabilizes the patella during knee movement. By serving as a check rein ligament, it prevents patellar dislocation during early flexion of the knee before the patella engages in the trochlea [4]. Recurrent patellar instability (RPI) is thought to affect 14 to 148 people per 100,000 annually, especially children, teenagers and young adult [5, 6]. MPFL reconstruction is the procedure of choice if the patient experiences patellofemoral dislocation despite adequate, non-surgical rehabilitation following a primary patellofemoral dislocation [7]. There are

numerous reconstructive procedures that employ various grafts and fixation strategies, but the majority of them necessitate the use of bone-related treatments such as trochleoplasty, medialization, or anteromedialization of the tibial tuberosity [7, 8].

In this study, we reported a unique case of recurrent patellar instability where we did MPFL reconstruction using semitendinosus and gracilis autograft with anteromedialization of tibial tuberosity.

CASE REPORT

A 20 years old female presented to us with a history of left knee pain for 5 yrs. During this time she observes for dislocation of the patella at regular interval, at that time of occurrence, she felt severe pain. She was unable to reduce the patella herself. Over the next 10 to 15 minutes, her left knee swelled considerably compared with her right. We performed the "patellar apprehension test" by pressing the patella laterally with the thumb while flexing the knee slowly and found positive which may induce anxiety and sharp resistance. There was lateral joint line tenderness.

Radiographic View



Figure 1: Pre-operative X-ray left knee AP view (A) & Lateral view (B)



Figure 2: Pre-operative X-ray left knee skyline view showing patella tilted laterally



Figure 3: Post-operative X-ray left knee AP view (A) & Lateral view (B)

Surgical Technique of MPFL Reconstruction

The patient was kept in supine position and a tourniquet was applied on the upper thigh. Diagnostic arthroscopy was done to evaluate patellar tracking and looked for intra articular damage.

- A 3cm incision was made, 3 cm medial to the inferior portion of the tibial tuberosity and harvests the semitendinosus tendon, sized the folded graft & placed a 0 Vicryl suture in each tail of the semitendinosus graft.

A gracilis graft was harvested through a 3 cm medial longitudinal incision over the pes anserinus. The graft was whipstitched with number 2/0 prolene.

- Then a two 2-cm incisions were made, the first just medial to the superior border of the patella and the second starting at the adductor tubercle and extending just distal to the medial epicondyle of the femur, to expose the patello-femoral ligament.
- We made a 1.5-cm incision in the retinaculum adjacent to the quadriceps insertion & a second 1-cm vertical incision 1.5 cm lateral to the first incision was made through the quadriceps and passed a second loop suture to use as a shuttle for the graft.
- Blunt dissection was made between layers 2 and 3, staying extra synovial and developing the plane with a curved clamp directed toward the medial epicondyle, spreading between the layers to create a soft-tissue tunnel. Clamp was used to pass a looped suture to use as a shuttle

for the tunnel & shuttling one tail of the graft through the slit in the quadriceps and then shuttled both tails through the MPFL tunnel to the femoral insertion site.

Around 8mm distal to Adductor tubercle was selected for the site of femoral tunnel.

- After that a Beath-tip guidewire was placed at the chosen spot, and passed two suture tails from the graft around the wire. Sutures were marked. Reaming of a 30-mm tunnel at the selected femoral tunnel site was done.
- The graft was pulled taut, and the patella was stressed. After determining the appropriate tension, a mark was made on the graft & was cut 20 mm distal to this mark for placing into the tunnel.
- Absorbable whip sutures were placed in the tail of the graft which was placed into the tip of a beath pin & was pulled laterally & fixed with a biocomposite screw.
- The retinaculum was repaired and a suture was placed in the quadriceps tendon just proximal to the split.
- The wound was closed in layers. A postoperative dressing and a knee brace was applied.



Figure 4: Harvested Semitendinosus tendon & introduced into the tunnel near to Adductor tubercle



Figure 5: Keeping the knee joint bent in a 45° angle & tightness of the lateral retinaculum was maintained after MPFL reconstruction

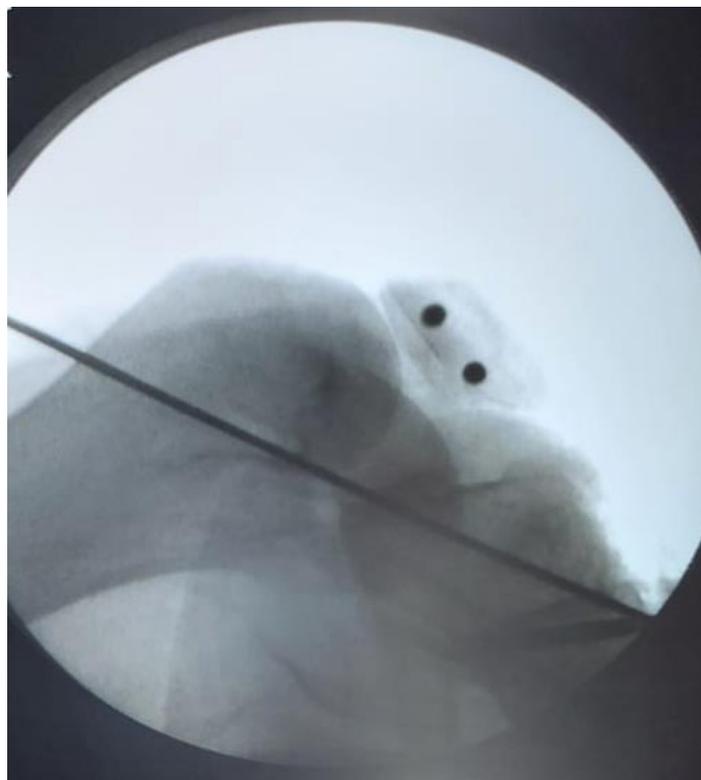


Figure 6: Femoral attachment site under fluoroscopy, marked the isometric point



Figure 7: Screw fixation

Postoperative Care

The knee joint was immediately immobilized in extension position. Patient was advised Quadriceps isometric strength exercises & weight bearing as tolerated in hinged knee brace for 6 weeks in full extension. After 6 weeks, full motion was restored and allowed to ambulate without brace. Full activity was allowed at 4-6 months following surgery.

DISCUSSION

The medial patellofemoral ligament (MPFL) is the primary passive restraint in pathologic lateral translation of the patella. [9-12] Patellofemoral dislocations are typically seen when the knee is flexed in a valgus posture over an externally rotated tibia [13]. Medial patellofemoral ligament (MPFL) reconstruction has been established as a therapy for treating recurrent patellar dislocation when a rehabilitation program has failed [14, 15].

Patellar instability is a common clinical problem affecting a young, active population. A large number of procedures have been described to treat patellar instability with varying clinical results [16, 17].

Matthews *et al.*, performed reconstruction by using either the gracilis or semitendinosus tendon autograft. No patella redislocations were observed. In their study 20% patients required a manipulation under

anaesthetic but subsequently regained a satisfactory range of motion. Medial patellofemoral reconstruction with both gracilis and semitendinosus tendon graft using a longitudinal tunnel technique provided good postoperative stability restoring the primary soft tissue restraint to pathological lateral patellar displacement with no complications of post-operative patellar fracture [18].

Khetan *et al.*, used modified technique for medial patellofemoral ligament reconstruction. They found 72.5% of the patients had an excellent outcome. About 15% of the patients had a good outcome whereas 10% had a fair outcome [7].

Laksana *et al.*, found that treatment of recurrent patellar instability with medial patellofemoral ligament reconstruction using gracilis autograft resulted in satisfactory functional outcome [19].

In our study, we performed MPFL reconstruction using semitendinosus and gracilis autograft with anteromedialization of tibial tuberosity. The patient was able to resume normal daily activities without complaint following the surgery.

CONCLUSION

Medial patellofemoral ligament (MPFL) reconstruction appears to be a safe and efficient surgical

procedure and nowadays it has become a popular method for treating individuals with recurrent patellar instability. According to this study, MPFL reconstruction using semitendinosus and gracilis autograft combined with anteromedialization of the tibial tuberosity is regarded to offer a favorable functional outcome while treating RPI.

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