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A rare case report of isolated medial patellofemoral ligament reconstruction using autogenous grafting

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ABSTRACT

Following a patellar dislocation, medial patellofemoral ligament injury is frequently observed. This report describes a case of a female patient, age 31 years experiencing recurrent patellofemoral instability and a post-traumatic tear of the medial patellofemoral ligament (MPFL) without any pathoanatomical risk factors. After her primary patellar dislocation, she was initially given conservative treatment with concentric exercises to bolster the vastus medialis and quadriceps. Even after initial conservative treatment, the patient now presented with a history of repeated occurrences of recurrent dislocations during the previous five years. For isolated medial patellofemoral ligament reconstruction, an autogenous gracilis graft was inserted using suture anchors and an interference screw in a double bundle L shaped fashion. Following a post-operative rehabilitation plan for at least a year revealed outstanding clinical results, as shown by a comparison of the Kujala, Lysholm and Tegner scores post operatively.

Keywords: Medial patella femoral ligament reconstruction, patellofemoral instability, Kujala patellofemoral score, Tegner and Lysholm knee score.

1. INTRODUCTION

Particularly in patients who are active, patellofemoral instability is most common (Halabchi et al., 2017). MPFL (Medial patella femoral ligament reconstruction) is the primary impediment to the lateral dislocation of patella during the initial 30° of knee flexion (Halabchi et al., 2017). Risk factors for this disorder include axial deformation, patella alta, mal-alignment syndromes and patella dysplasia (Dejour et al., 1994; Steensen et al., 2015). The MPFL was injured in majority of patients, regardless of what caused the initial patellar dislocation. Patella dislocations that repeat may be caused post conservative treatment (Askenberger et al., 2018). On the other hand, reconstruction of the MPFL produced outstanding clinical results in terms of quality of living, knee score ratings, as well as minimal rate of complications and recurring patella dislocations. Patients who have associated low to moderate pathoanatomical risk factors may still obtain satisfactory results with isolated MPFL

restoration, avoiding more invasive treatments (Blanke et al., 2020). In this case report, a patient with patella instability without pathoanatomical risk factors who went in for a solitary medial patellofemoral ligament repair using a gracilis autograft (Migliorini et al., 2021; Erickson et al., 2019; Arshi et al., 2016) and underwent at least a one-year follow-up will have her results evaluated using knee scoring systems to show excellent clinical outcome.

2. CASE REPORT

A female patient aged 31-year came to our OPD with the chief complaint of pain & swelling over the right knee for the past 2 years. The patient had an alleged history of trauma & sustained an injury to the right knee 8 years back. History of multiple episodes of knee instability and patellar dislocation which relocates spontaneously in the past 5 years, history of pain aggravating during walking and standing and relieved by rest. No other comorbidities. As preoperative planning routine blood investigations were done. On examination you look for a positive J sign and perform the lateral patellar apprehension test to confirm a subluxing or dislocating patella (Figure 1). Normal X-ray Anteroposterior and lateral views were done to rule out avulsion fractures associated with MPFL injury (Figure 2). Lateral view of knee and patella skyline view radiographs were done to measure Insall-Salvati index which is done to rule out patella alta and patella baja; sulcus angle is important in ruling out trochlear dysplasia (Figure 3). MRI of the knee done showed hyper intense signal shift noted over the femoral condyle at the MPFL insertion site (Figure 4). After getting anesthetic fitness for surgery patient was planned for isolated MPFL reconstruction using an autogenous gracilis graft in a double bundle L shaped fashion (Figure 5) inserted into the MPFL footprint in the femoral condyle (Figure 6). Post operatively patellar tracking test is done to confirm the normal tracking of the patella allowing up to 30° of knee flexion in the first 2 weeks (Figure 7). In order to determine whether the normal patellar height was maintained following surgery, immediate post-operative X-rays in the anteroposterior and lateral views were taken (Figure 8). After 2 weeks, 30° of knee flexion was gradually increased weekly and weight bearing as tolerated by the patient. The patient was then followed up with at 1 month, 3 months, 6 months and 1 year, during which she demonstrated excellent clinical outcome by demonstrating significant improvement in the kujala score with a score of 12.8 and lysholm score of 15.7 along with a tegner score of 2.9 compared to her pre-operative scores.

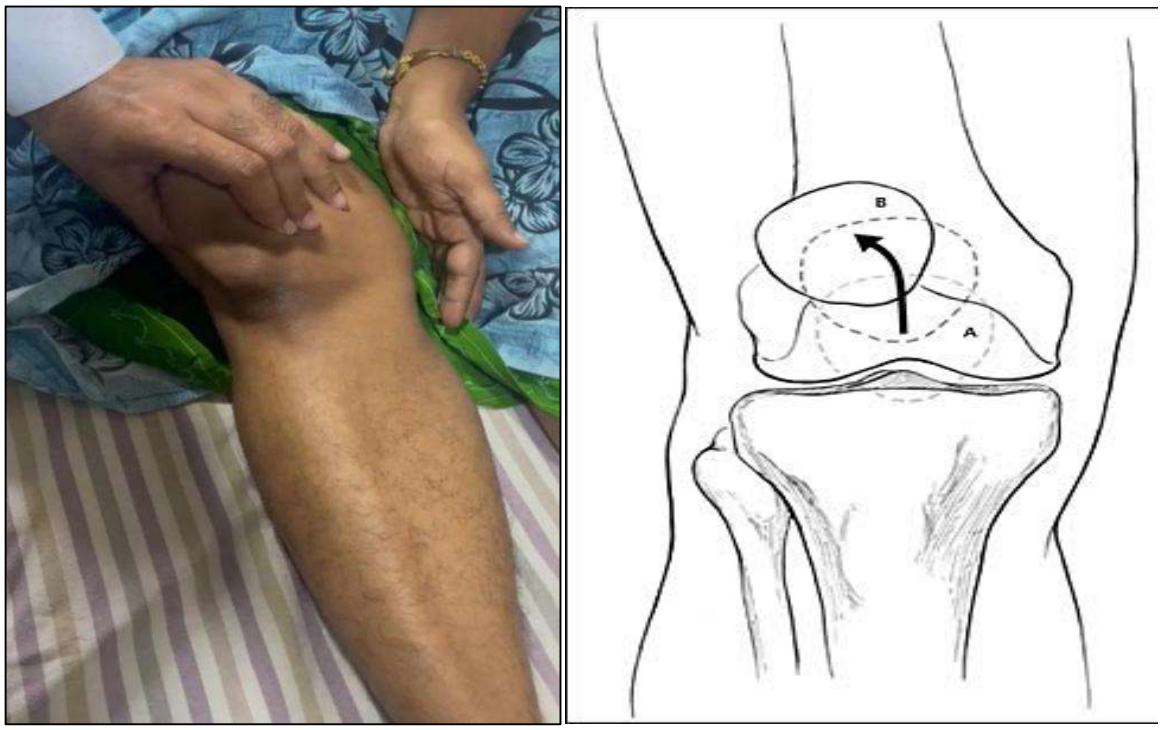

Figure 1 J sign, Lateral Patellar apprehension test

The patient is examined prior to surgery to rule out any patella instability or mal tracking. A positive J sign is displayed by either a quick jump or a delayed patellar centering into the trochlear groove. Flex the knee to a 30° angle to relax the quadriceps muscle and then apply pressure over medial aspect of the patella to produce a force directed laterally. If patient feels pain or Figure 2 Pre-operative X-RAY anxiety as a result of the patella shifting to the side, which are symptoms of a subluxing or dislocating patella, the test is positive.

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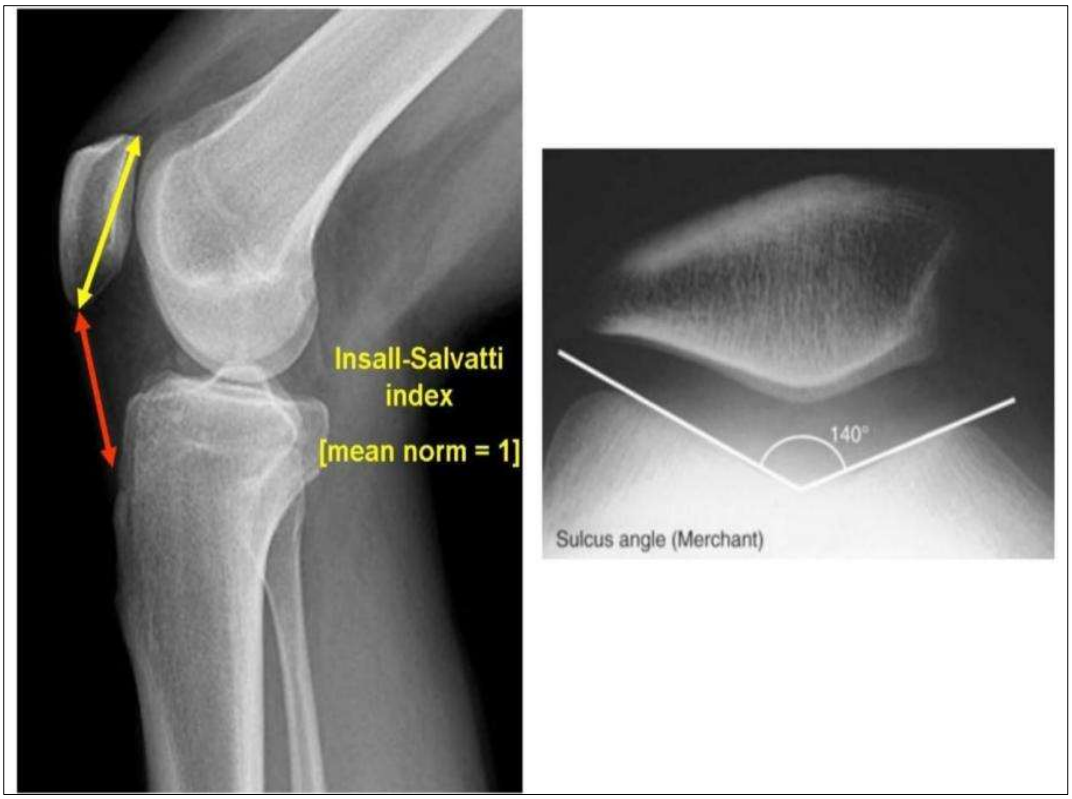


Figure 3 Insall-Salvati Index, Sulcus Angle

By using a normal value of 0.74 to 1.0 to rule out patella Alta and patella Baja, the patella height is measured by calculating the patella tendon length to patella length ratio. The inter condylar groove angle, which has a normal value of 135+/- 10° and is used to rule out trochlear dysplasia, is constructed by joining two lines from the inter condylar groove's lowest point to the highest point of the medial and lateral condyles.

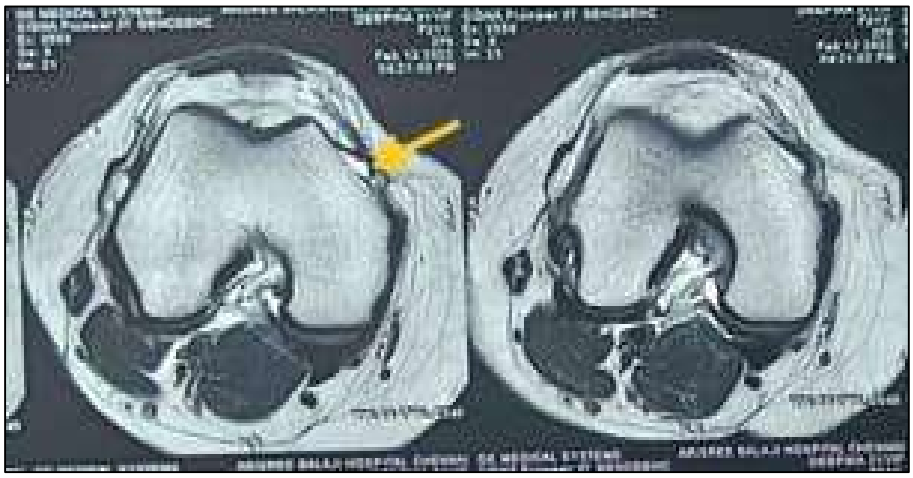
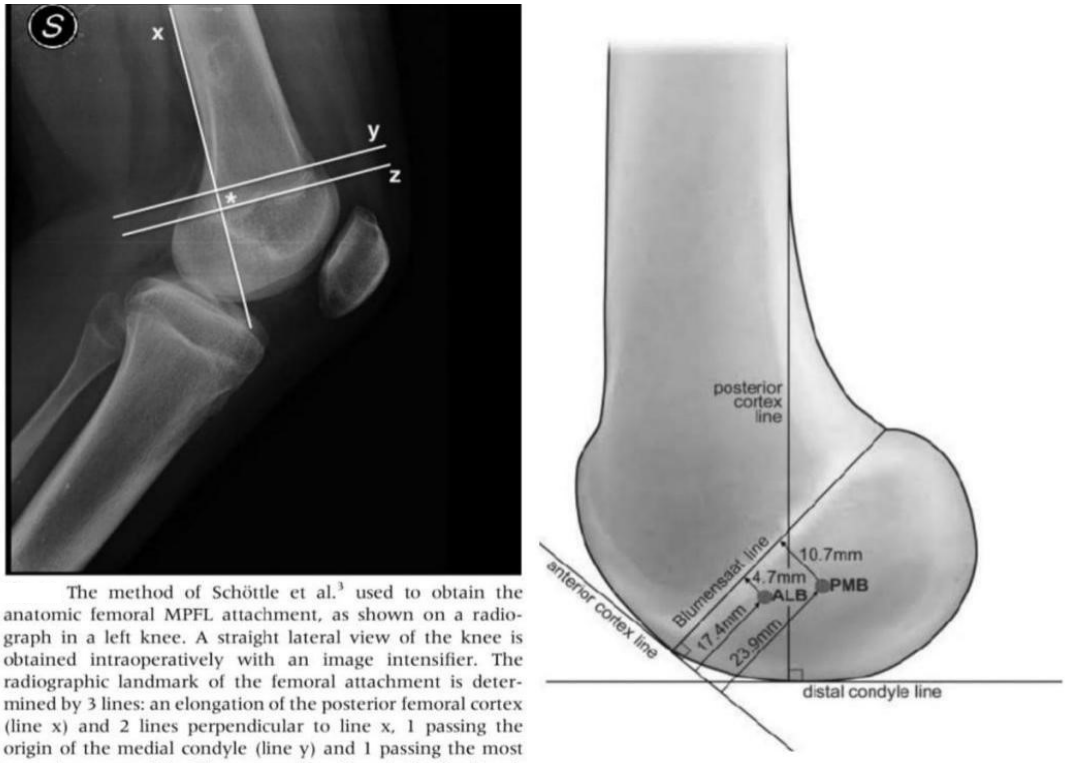


Figure 4 MRI right knee-Axial knee cut demonstrating hyper intense signal shift over the femoral condyle at the MPFL insertion site

3. SURGICAL MANAGEMENT

Under SA, ASP patient in supine position under TQ control parts painted & draped. 2 standard portals were made (anteromedial & anterolateral). Following were the findings–ACL, PCL, medial meniscus & lateral meniscus were examined & found to be intact. Ipsilateral gracilis graft was harvested. Across the medial aspect of patella, a 4 cm incision was made. Superomedial and inferomedial guide wires were introduced and SIRONIX screws with tip were secured. The harvested gracilis tendon is secured with a suture anchor of size 2.8mm in a double bundle L shaped fashion. Through tunnelling, the suture anchor ends were inserted into the medial femoral condyle's MPFL footprint insertion point and secured with a bio absorbable interference screw of size 7X25mm in 30◦ knee flexion. After performing a thorough wound wash, layering the wound closure, sterile dressing was done and long knee brace was applied. Postoperative period was uneventful and postoperative rehabilitation protocols were followed.

Figure 5 MPFL autogenous graft repair



The method of Schöttle et al.[3] used to obtain the anatomic femoral MPFL attachment, as shown on a radiograph in a left knee. A straight lateral view of the knee is obtained intraoperatively with an image intensifier. The radiographic landmark of the femoral attachment is determined by 3 lines: an elongation of the posterior femoral cortex (line x) and 2 lines perpendicular to line x, 1 passing the origin of the medial condyle (line y) and 1 passing the most posterior aspect of the Blumensaat line (line z). The landmark is anterior to line x and between lines y and z (asterisk).

Figure 6 MPFL foot print insertion site

Patellar tracking test

Figure 7 Patient is in a sitting position with her knee in extension. The patella should centre into the trochlear groove and track smoothly as the knee flexes between 10 and 30 degrees, along an inverted J shape route to indicate appropriate patella tracking following surgery

Figure 8 Post op X-ray is done to check if the normal patellar height is maintained

4. DISCUSSION

Following an initial patellar dislocation, the medial patellofemoral ligament is usually invariably injured, necessitating a ligament replacement. Patellar instability can be brought on by multiple risk factors, including post-traumatic patella instability and associated pathoanatomical risk factors like trochlear dysplasia, patella alta, mal-alignment syndromes, axial deformation and patellar dysplasia. In solitary MPFL reconstruction, patients associated with any imaging indication of pathoanatomical risk factors should be excluded. To identify patients who are best suited for isolated MPFL reconstruction and to rule out cases with pathoanatomical risk factors, patients who are scheduled for MPFL reconstruction should undergo preoperative planning. This entails taking an AP standing view, true lateral view and patella skyline view X-rays, performing a knee MRI and analyzing the patellar translation, medial patellar tilt, apprehension test and J sign. During the initial knee flexion of up to 30°, patella is guided into the femoral groove by MPFL repair surgery. The patient opted for an isolated MPFL reconstruction which was done with a harvested autogenous gracilis tendon graft (Migliorini et al., 2020) secured using suture anchors (Migliorini et al., 2020) in a double bundle (Migliorini et al., 2020) L shaped fashion for persistent patella instability in absence of pathoanatomical risk factors, which was evidenced by Kujala patellofemoral score, Lysholm score and Tegner activity scale, showing very good clinical results.

	Preoperative	Postoperative (At 1 year)	Improvement
Kujala	75.5	88.3	12.8
Lysholm	74.4	90.1	15.7
Tegner	2.4	5.3	2.9

When compared to patients without pathoanatomical risk factors, individuals associated with pathoanatomical risk factors had a higher rate of revision procedures, recurrent dislocations and continuous joint instability (Wagner et al., 2013). The surgical outcome of patients opting for MPFL reconstruction using autogenous grafting was compared using Kujala patellofemoral score, Tegner and Lysholm knee grading system (Kujala et al., 1993; Lysholm and Gillquist, 1982; Ballal et al., 2018).

5. CONCLUSION

A reliable surgical outcome is achieved with MPFL repair using autogenous grafting in individuals with persistent patellofemoral instability who do not have pathoanatomical risk factors. When compared using the Kujala patellofemoral score, Tegner and Lysholm knee grading system, patients with predisposing pathoanatomical characteristics reported worse outcomes as a result.

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Authors' contribution

Conceptualization, Supervision, Methodology, Resources, Data Collection, Writing and Formal analysis: Vijay Narasimman Reddy
Writing, Investigation, Resources, Analysis, Draft preparation, Review and Editing: Syed Nihal A
Writing, Investigation, Analysis, Review and Editing: J Jafer Sareef
All authors have read and agreed to submit the manuscript

Informed consent

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data collected during this study are available upon reasonable request from the corresponding author.

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