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Functional Outcome of Medial Patellofemoral Ligament Reconstruction Using Tensor Fascia Lata Harvest with Anchor Suture Fixation in Recurrent Patellar Dislocation

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ABSTRACT
Acute patella dislocation occurs primarily in young active patients. After art dislocation, 17-42% are likely to experience further dislocations, which substantially increase the risk developing subsequent patellofemoral instability, knee pain and decreased knee function. Medial patellofemoral ligament reconstruction (MPFLR) is the most commonly addressed surgical procedure to treat recurrent patellofemoral instability This study aims to assess the functional outcomes of patients undergoing medial patellofemoral ligament reconstruction using tensor fascia lata with anchor suture fixation and also assess the postoperative complications and patient's satisfaction level. This Prospective Study is carried out in the Department of Orthopaedics in Bhaskar medical College, Hyderabad, Telangana during February 2023-November 2023 that consists of 10 patients. Associated ligamentous injuries of the knee joint and previous history of bony correction along with medial patellofemoral ligament reconstruction are excluded from this study. The clinical evaluation was performed using Kujala knee score and visual analogue scale scores. Postoperative satisfaction level was performed using a self-constructed questionnaire. Ten cases were followed up for a period varying from 2-10 months after medial Patellofemoral Ligament Reconstruction Using Tensor Fascia lata harvest with anchor suture fixation in Recurrent Patellar Dislocation. Functional outcome of all the patients is well improved after the procedure and all the patients can perform Maximum range of knee flexion by 8-10 weeks. MPFL reconstruction using tensor Fascia lata for the recurrent patella dislocation provides satisfactory functional outcomes with minimal complications and is a cost-effective method for countries like India.

INTRODUCTION

Acute patella dislocation occurs primarily in young active patients. After arts dislocation, 17-42% are likely to experience further dislocations, which substantially increase the risk of developing subsequent patellofemoral instability, knee pain and decreased knee function[1]. Injury to the medial patellofemoral ligament (MPFL) is reported in the majority of patients following dislocation. Recurrent patellar dislocation is observed in many patients treated conservatively following primary dislocation. Medial patellofemoral ligament reconstruction (MPFLR) is the most commonly addressed surgical procedure to treat recurrent patellofemoral instability[2]. This study introduces a surgical technique using the tensor fascia lata as an alternative to auto graft or allograft for anatomic reconstruction of the Medial patella femoral Ligament[3].

Aims and Objective: This study aims to assess the functional outcome of patients undergoing medial patellofemoral ligament reconstruction using tensor fascia lata with anchor suture fixation and also assess the postoperative complications and patient's satisfaction level.

Anatomy: The patellofemoral joint is the articulation between the patella and the trochlear groove of the femur. The patella is a systemwide bone encased in the quadriceps mechanism, its presence increases the mechanical advantage of the quadriceps, protects the knee and plays a role in overall cosmetic. Medial patellofemoral ligament: Originates from the adductor tubercle and gets inserted on the superomedial border of the patella. It is thin structure within layer 2 of the medial knee soft tissues, closely attached to the undersurface of the vastus medalist oblique (VMO), Primary constraint to lateral patellar instability with knee flexion 0-20 degrees[4,5].

MATERIALS AND METHODS

This Prospective Study is carried out in the Department of Orthopaedics in Bhaskar medical College, Hyderabad, Telangana during February 2023 to November 2023 that consists of 10 patients.

Inclusion Criteria:

- Patients with recurrent patellar dislocation reported to Out patient department
- Primary patellar dislocation with persistent positive apprehension test
- Dejour type A trochlear dysplasia

Exclusion Criteria:

- Associated ligamentous injuries of the knee joint
- previous history of bony correction along with medial patellofemoral ligament reconstruction
- Severe rotational malalignment
- Severe trochlear dysplasia, type B-D according to Dejour classification

The clinical evaluation was performed using Kujala knee score and visual analogue scale scores. Postoperative satisfaction level was performed using a self-constructed questionnaire.

Operative Technique:

- Supine position, under spinal anaesthesia, with tourniquet applied
- Diagnostic arthroscopy of the knee-to evaluate patellofemoral cartilage, dynamic lateralization and patellar tilt
- Graft preparation
- 8cm long incision is given at the lateral thigh approximately 4 finger breadths above the upper border of the patella. After blunt dissection, a graft of 10mm in width and 12cm in length is excised
- The harvested auto graft is cleared of fat and muscle tissue at full length using a blunt scissor. Each of the graft end is sutured with a nonabsorbable suture (ethibond 5-0) with a whip-stitch technique and kept aside. Patella tunnel preparation
- 2cm incision is given along medial margin of the patella
- 2 holes are created inside the proximal, rd of the patella, by passing 2mm guide wires tangentially and parallel to each other at the patellar medial margin
- Under C -arm guidance, 4mm drill is passed over guide wires, two 2.5cm deep holes are created.
- Anchor suture Fixation
- The one end of graft is fixed inside the proximal tunnel, with 4.75mm Bio Skive Lock anchor .The other end of the graft is fixed in the distal hole in similar fashion with anchor screw
- Femoral tunnel preparation
- Under C-Arm guidance, Shuttle's point is identified and confirmed
- A Beath pin is aimed anteriorly and proximally so that it exits through the lateral soft tissues.
- 6.5mm annulated drill hole is reamed over it to create femoral tunnel
- Soft tissue passage preparation
- After palpating medial epicondyle with knee in 30 degree of flexion, 2cm skin incision is given at this point next to the adductor tubercle
- Next, a tunnel is created between the second and third layers of the native MPFL's position through the sub vastus space
- After blunt preparation of the tunnel, the tip of an Kocher forceps is passed from the patellar insertion side to the medial epicondyle exit
- by pulling the loop of fascia lata graft to the femoral exit. Graft is then guided into the tunnel with a shuttle wire using the eyelet of the

- guide wire, which is pulled through the tunnel to exit on the lateral femoral side
- Finally, the grafts are fixed inside the femur at 30 of knee flexion with adequate tension by pulling the sutures from the lateral side
- After the correct tension and position of the grafts have been examined, a 6mm
- bioabsorbable interference screw is fixed inside the femoral bone, followed by a final check to prevent over correction or over tensioning
- Finally the wounds are sutured with non absorbable suture prolene 2-0 and sterile
- dressings applied

Postoperative Follow up: Partial weight-bearing up to 4 weeks. Hinge knee brace was given until the patients gained good quadriceps control Quadriceps strengthening
exercises

- clinical evaluation was done using Kujala knee score and visual analogue scale (VAS)score
- Postoperative satisfaction level is assessed using a self-constructed questionnaire that includes very satisfied, satisfied, neutral and dissatisfied with the procedure
- Post operative complications include Superficial Infection, Patella fracture, Knee stiffness, Re-Dislocation/subluxation

Functional outcome of all the patients is well improved after the procedure and all the patients can perform maximum range of knee flexion by 8-10 weeks.

Postoperatively, 8 patients were very satisfied with the surgery, 2 patients were satisfied and none of the patients were dissatisfied.

RESULTS AND DISCUSSIONS

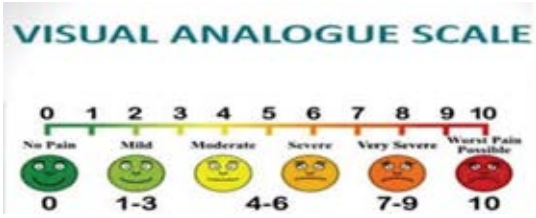

Fig. 1.Visual analogue scale

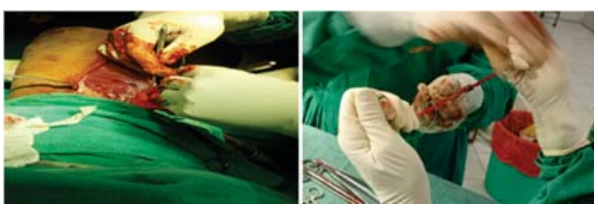

Fig. 2: Harvesting graft suturing graft ends

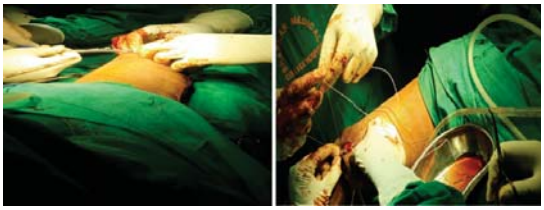

Fig. 3: Patellar tunnel preparation anchor suture fixation

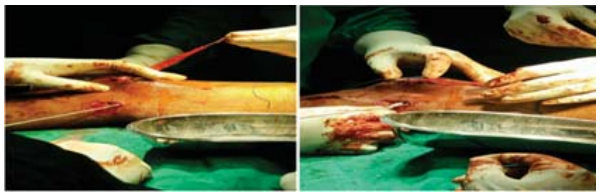

Fig. 4: Femoral tunnel preparation Graft passage through tunnel created

Fig. 5: Femoral tunnel screw fixation

Fig. 6: Preoperative X ray. post operative X ray

Fig. 7: 4 weeks follow up

Fig. 8: 8 weeks follow up

Table 1: Analogue Scale

Variable	Score
Limp	
None	5
Slight or periodical	3
Constant	0
Support	
Full support without pain	5
Painful	3
Weight bearing impossible	0
Walking	
Unlimited	5
More than 2Km	3
1-2Km	2
Unable	0
Stairs	
No difficulty	10
Slight Pain when descending	8
Pain both when descending and ascending	5
Unable	0
Squatting	
NO difficulty	10
Repeated squatting painful	4
Pain full each time	3
Possible with partial weight bearing	2
Running	
No difficulty	10
Pain after more than 2km	8
Slight pain from start	6
Severe pain	3
Unable	0
Jumping	
No difficulty	10
Slight difficulty	7
Constant Pain	2
unable	0
Prolonged sitting with the knees fixed	
No difficulty	10
pain after exercise	8
Constant pain	6
Pain forces to extend knee temporary	4
Unable	0
Pain	
None	10
Slight and occasional	8
Interferers with sleep	6
Occasionally severe	3
Constant and servers	0
Swelling	
None	10
After severe exertion	8
After daily activities	6
Every evening	4
Constant	0
Abnormal painful kneecap movement (subluxation)	
None	10
Occasionally in sports activities	6
Occasionally in daily activities	4
At least one documented as location	2
More that two dislocations	0
Atrophy of thigh	
none	5
Slight	3
Severe	0
Flexion deficiency	
None	5
Slight	3
Severe	0

Total Score: 95-100, excellent: 80-94, Good: 60-79, fair: 0-60 Poor

Table 2: At final follow up

	Pre operative	Post operative
Kujala score	72	95
Visual Analogue scale score	3.5	1

Attention to MPFL reconstruction in the orthopaedic literature has increased dramatically in recent years, with over 200 peer-reviewed publica The important point of our paper is to introduce reconstruction of the MPFL with a part of the fascia tions since.

Recurrent patellar dislocation is a debilitating condition that significantly affects knee stability and function, posing a challenge for both patients and orthopedic surgeons. The medial patellofemoral ligament (MPFL) is a critical structure in maintaining patellar stability and is often disrupted in cases of recurrent dislocation. Consequently, reconstructive surgery, specifically MPFL reconstruction, has emerged as a vital intervention to restore patellar stability and improve patient outcomes[4]. One innovative approach to MPFL reconstruction involves the use of the tensor fascia lata (TFL) as a graft material, combined with anchor suture fixation. This method has garnered attention due to its potential to provide a robust anatomical repair with good functional outcomes. The TFL, a broad and flat muscle primarily involved in hip abduction, provides a strong fascial layer that can be harvested as a graft without significant donor site morbidity. This attribute makes it an attractive option for surgeons seeking durable graft material for ligament reconstruction[5].

The principle behind using the TFL graft lies in its tensile strength and flexibility, which are essential for mimicking the natural dynamics of the medial patellofemoral ligament. When coupled with anchor suture fixation-a technique that secures the graft to bone using small, often bioresorbable, anchors-the reconstruction aims to replicate the original attachment points and tension patterns of the native MPFL. This is critical in ensuring that the patella tracks correctly within the femoral groove during knee flexion and extension, thereby reducing the risk of redislocation[6,7].

Clinical studies assessing this technique have reported promising results. Patients undergoing MPFL reconstruction with TFL grafts generally experience significant improvements in stability, reduction in pain and enhanced functional performance. Standard outcome measures such as the Kujala Anterior Knee Pain Scale, which evaluates symptoms and function in patellofemoral disorders, often show marked improvement post-surgery. Furthermore, the rate of recurrent dislocation post-reconstruction is notably low, highlighting the efficacy of this surgical approach in preventing further episodes[8,9].

However, despite the benefits, there are considerations and potential drawbacks to this method. One concern involves the technical complexity of the procedure. Proper alignment and tension of the graft are imperative to avoid over constraint of the patella, which could lead to altered kinematics and increased joint stress. Additionally, while the donor site morbidity associated with TFL harvest is minimal compared to other graft sources, issues such as cosmetic concerns or slight functional impairment at the harvest site can occur[10,11].

Long-term outcomes and the durability of the repair are also critical aspects under continuous evaluation. While short-term results appear favorable, longer follow-up is necessary to assess how well these reconstructions withstand the rigors of daily activities and whether any late complications, such as graft stretching or fixation failure, might arise. Moreover, patient selection plays a pivotal role in the success of this surgical intervention. Factors such as patient age, activity level, and presence of comorbid conditions like trochlear dysplasia or high body mass index may influence the outcomes and should be considered during preoperative planning[12]. lata as an alternative graft to the gracilis tendon. The reason behind this is to find an anatomic structure Functional outcome of all the patients is well improved after the procedure and all the patients can perform maximum range of knee flexion by 8-10 weeks. whose shape and bio mechanical kinematics are very similar to the original tissue.

Advantages:
Minimally invasive technique
Easy harvest and preparation of autocrat
No weakening of other structures required
Preservation of tendon grafts (gracilis and semitendinosus)
Possibility of reconstructing MPFL in revision cases (in case there are no tendons left as auto grafts)

Risks: Risk of traumatic patellar fracture or cartilage damage during the creation of both tunnels inside the medial upper 2/3rd of the patella. Over-tensioning of the grafts may lead to cartilage damage and pain, followed by premature arthrosis of the knee.

Keypoint: It is very important to find the correct femoral insertion point of the medial patellofemoral ligament to ensure proper fixation and tension of the reconstructed MPFL and consequently the desired function.

CONCLUSION

MPFL reconstruction using tensor Fascia lata for the recurrent patella dislocation provides satisfactory functional outcomes with minimal complications. Therefore the presented minimally invasive technique with the possibility of harvesting the fascia lata offers a viable alternative for anatomic reconstruction of the MPFL.

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