Original Research

FUNCTIONAL OUTCOME OF MEDIAL PATELLO-FEMORAL LIGAMENT RECONSTRUCTION IN RECURRENT PATELLA DISLOCATION USING SEMITENDINOSUS TENDON AUTO-GRAFT

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ABSTRACT

Background: One of the rare disabilities include patellar instability. It happens mostly in younger patients. According to biochemical studies, medial patella-femoral ligament (MPFL) prevents lateral displacement of patella. MPFL mainly acts as the main soft tissue stabilizer. Anatomical reconstruction of MPFL is a surgical procedure which is used for patients having severe recurrent patellar dislocation to restore stability to the knee. In order to treat patellar instability, there are several surgical procedures described which include both soft tissue procedures like MPFL reconstruction and bony procedures. **Objective:** To determine the functional outcome of medial patella-femoral reconstruction by using the semitendinosus tendon auto-graft on patients having recurrent patella dislocation **Study design:** A descriptive study. **Duration and place of study:** This study was conducted at Hamdard University Hospital Karachi Pakistan from December 2024 to December 2025

Methodology: This research was conducted in our hospital. Patients were aged from 18 years to 45 years and both the genders were included. All the patients were having unilateral recurrent patella dislocation. Patients with MPFL tear, with or without meniscal injury detected clinically and confirmed by MRI were included. Clinical examination along with the complete history of all the participants was taken.The International Knee Documentation Committee (IKDC) score was used to assess pre-operative functional status. All the demographic data, mode injury, and type of injury was recorded. SPSS version 23 was used to analyse the data. Parametric t-test was used to compare pre-operative and post-operative IKDC scores.

Results: There were a total of 60 patients enrolled in this study. There were 22 males and 38 females included in this study. The mean age calculated was 24.1 ± 11.4 years. 60% of the patients were presented with isolated MPFL injury. Right sided recurrent patella dislocation was noted in 61.6% patients. The majority of the patients had sports related injuries, representing 53.3% of the total participants. The majority of the patients gave pre-operative history of guarded walking (68.3%). 8.3% were giving signs of instability or giving away, 36.6% were giving signs of locking, and 35% were giving signs of activity-related pain. Clinical examination showed a positive patella apprehension sign in 81.6% of the patients. At 1 year of follow-up, the mean IKDC score improved from 42.4 ± 9.3 (pre-operative) to 86.3 ± 12.6 (post-operative).

Conclusion: Medial patello-femoral ligament (MPFL) reconstruction using semitendinosus tendon auto-graft is an effective surgical method to treat recurrent patella dislocation.

INTRODUCTION

One of the rare disabilities include patellar instability [1]. It happens mostly in younger patients. There are multifunctional causes of patellar instability. The causes may include pathology of bony and soft tissue constraints around the knee [2,3]. According to biochemical studies, medial patella-femoral ligament (MPFL) prevents lateral displacement of patella [4,5]. MPFL mainly acts as the main soft tissue stabilizer. The injury to MPFL is often considered as the quintessential lesion [5].

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Anatomical reconstruction of MPFL is a surgical procedure which is used for patients having severe recurrent patellar dislocation to restore stability to the knee [7]. The MPFL is a band of soft tissue which extends from the medial epicondyle of the femur to the superior pole of the patella. It prevents the patella from moving too far laterally [8]. The patella becomes unstable when this ligament is stretched or torn due to repeated dislocations. In order to treat patellar instability, there are several surgical procedures described which include both soft tissue procedures like MPFL reconstruction and bony procedures [9,10]. However, clinical outcomes have been variable, depending on factors such as patient anatomy, surgical method, and the knee abnormalities linked.

Therefore, this study was conducted on patients having recurrent patella dislocation to determine the functional outcome of medial patella-femoral reconstruction by using the semitendinosus tendon auto-graft.

METHODOLOGY

This research is a descriptive study which was performed in the Orthopaedic Department of the hospital. Patients who were included in this research were aged from 18 years to 45 years and both the genders were included. All the patients were having unilateral recurrent patella dislocation. Patients with MPFL tear, with or without meniscal injury detected clinically and confirmed by MRI were included. All the participants of this study had a tibial tuberosity-trochlear groove (TT-TG) distance < 15 mm. They also had an Insall-Salvati ratio between 0.8 to 1.2 on radiological assessment. Patients were informed about the study and their written consent was obtained. The Ethical Review Committee approved this research.

Exclusion criteria: Patients who had fractures around the knee were not a part of this study. Moreover, patients with knee osteoarthritis, associated ligament injuries, and generalized ligamentous laxity were also excluded.

Clinical examination along with the complete history of all the participants was taken. Some relevant investigations such as CT scan, radiographs, and MRI were also done. The International Knee Documentation Committee (IKDC) score was used to assess pre-operative functional status. All the demographic data of the patients was recorded which included age and gender. Moreover, type of injury (MPFL tear with meniscal injury or isolated MPFL tear) and mode of injury (sports injury, vehicle accident injury, fall, or others) were also recorded.

All those patients who even had constant feeling of patellar instability or had documented recurrent patellar dislocation underwent medial patello-femoral reconstruction (MPFL). Associated medial meniscus injuries were treated by either meniscal repair or by meniscectomy using Arthrex Meniscal Cinch where indicated. Patients were given general or spinal anesthesia with tourniquet control. To assess and treat any associated meniscus injury with meniscal repair or meniscectomy, diagnostic arthroscopy was first performed. A semitendinous graft was harvested from the pes anserine insertion and prepared. Under fluoroscopic guidance, 2 tunnels were drilled in the medial patella. A femoral tunnel was also created at the medial epicondyle. The graft was passed through the patellar tunnels and fixed in the femoral tunnel at 30° of knee flexion. A bioadsorbable interference screw was used to perform this.

Initially, all the patients were followed at the 2nd, 4th, and 6th week. Later, they were followed at 3rd, 6th, and 12th months. Staples were removed in 2 weeks. IKDC score was used to re-assess the functional outcome at one year. SPSS version 23 was used to analyse the data. Parametric t-test was used to compare pre-operative and post-operative IKDC scores. A p-value of less than 0.05 was considered significant.

RESULTS

There were a total of 60 patients enrolled in this research. Most of the patients were female, representing 63.3% of the total population. The mean age calculated was 24.1 ± 11.4 years. There were 36 patients who were presented with isolated MPFL injury while the rest were presented with MPFL and medial meniscal injury (n=24). 32 patients had sports related injuries, which is the highest number. 16 had fall related injuries while 12 had road accident related injuries. Table number 1 shows the demographic and clinical characteristics.

Table No. 1:

Characteristics	N	%
Gender		
● **Female**	38	63.3
● **Male**	22	36.4
Type of Injury		
● **MPFL + Medial Meniscal injury**	24	40.0
● **Isolated MPFL injury**	36	60.0

Side of dislocation		
● **Left**	23	38.4
● **Right**	37	61.6
Mode of Injury		
● **Road traffic accident**	12	20.0
● **Fall**	16	26.7
● **Sports**	32	53.3

Table number 2 shows the data of pre-operative history of the study patients. The majority of the patients gave pre-operative history of guarded walking (68.3%). 8.3% were giving signs of instability or giving away, 36.6% were giving signs of locking, and 35% were giving signs of activity-related pain.

Table No. 2:

Pre-operative history	**N**	**%**
Instability/Giving Away	5	8.3
Guarded walking	41	68.3
Locking	22	36.6
Activity-related pain	21	35.0

Table number 3 shows the clinical examination findings.

Table No. 3:

Findings	**N**	**%**
Knee flexion loss	27	45.0
Positive Patella Apprehension sign	49	81.6
Medial femoral condyle tenderness	16	26.7
Medial Patella tenderness	32	53.3

Table number 4 shows the analysis of pre and post operative mean IKDC scores. At 1 year of follow-up, the mean IKDC score improved from 42.4 ± 9.3 (pre-operative) to 86.3 ± 12.6 (post-operative).

Table No. 4:

Parameters	**Pre-operative IKDC score**	**Post-operative IKDC score**
Gender		
● **Female**	39.1 ± 13.3	81.1 ± 11.2
● **Male**	49.5 ± 8.2	89.9 ± 8.1
Type of Injury		
● **MPFL + Medial Meniscal injury**	33.9 ± 17.1	81.1 ± 9.2
● **Isolated MPFL injury**	47.2 ± 10.1	89.3 ± 10.1
Age (yrs)		
● **18 to 30**	42.1 ± 7.0	87.5 ± 9.6
● **30 to 45**	38.7 ± 11.5	79.4 ± 17.1
Time of presentation (months)		
● **0 to 6**	49.1 ± 9.2	89.6 ± 10.1
● **6 to 12**	41.7 ± 13.1	81.2 ± 9.5
● **More than 12**	35.3 ± 7.6	72.4 ± 15.7

DISCUSSION

In order to treat patello-femoral instability effectively, medial patello-femoral ligament (MPFL) reconstruction is used [11]. This procedure restores the main medial soft-tissue restraint of the patella. Our study was conducted on 60 patients who had recurrent patellar dislocation and underwent MPFL reconstruction. In developing countries like Pakistan, there is limited access to specialized care. This often leads to conservative management of recurrent patellar dislocation. If we talk about non-operative treatment, there is more than 50% risk of recurrence in this [12]. It may result in osteoarthritis and reduce knee function. Older soft-tissue procedures are associated with poor long-term results and can disturb normal patello-femoral

biomechanics [13]. Lateral patello-femoral release is counted as an older soft-tissue procedure. Therefore, it is recommended that anatomical MPFL reconstruction should become the preferred treatment.

According to the outcomes of our study, MPFL reconstruction provides significant functional improvement and it is associated with low peri-operative morbidity. We used a semitendinous hamstring tendon autograft in all the patients. According to the previous research studies, hamstring autografts have shown good success rates [14,15]. Although there are many variations that exist in surgical methods, including number of graft bundles, tunnel placement, and fixation methods, hamstring autografts showed good results. Similar to our findings, Howells and Barnett also used screw fixation and achieved good results [16].

In order to successfully use MPFL reconstruction, it is important to properly understand ligament anatomy and biomechanics. Similarly, graft isometry is crucial. The reconstructed ligament must remain tensioned between 0° and 30° of knee flexion [17]. It is done to guide the patella into the trochlear groove and then relax during flexion. In our study, 73.3% of patients achieved excellent results. Our study's findings are similar to the findings of Nomura and Inoue who achieved 60% good results by using MPFL reconstruction [18].

Ercan et al. compared single-tunnel and double-tunnel semitendinous autograft methods in their study [19]. There was no difference found between both the methods. Moreover, both of the methods showed significant functional improvement. We used a single-bundle semitendinosus graft and achieved good results without failure. Some other studies have supported double-bundle reconstruction [20]. However, our study showed effective and reliable results for single-bundle semitendinosus autograft.

There were a few limitations of our study. First is that the sample size was relatively small. The second is that the follow-up period was short. Therefore, we recommend further studies with larger scale and longer follow-up period to confirm long-term effectiveness of this procedure.

CONCLUSION

Medial patello-femoral ligament (MPFL) reconstruction using semitendinosus tendon auto-graft is an effective surgical method to treat recurrent patella dislocation.

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Conflict in the interest

The authors had no conflict related to the interest in the execution of this study.

Permission

Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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