

Original Research Article

Comparative analysis of MPFL reconstruction in recurrent dislocation of patella using peroneus longus graft versus semitendinosus: a retrospective study

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ABSTRACT

Background: Recurrent patellar dislocation is most commonly associated with injury to the medial patellofemoral ligament (MPFL). MPFL reconstruction is the standard treatment. While semitendinosus tendon is traditionally used, peroneus longus tendon has emerged as an alternative graft with potentially less donor-site morbidity. This study aimed to compare functional outcomes, patient satisfaction, complications, and failure rates following MPFL reconstruction using peroneus longus versus semitendinosus tendon.

Methods: A retrospective comparative study was conducted on 30 patients with recurrent patellar dislocation. Group A (n=15) underwent MPFL reconstruction using semitendinosus graft, and Group B (n=15) using peroneus longus graft. Patients were followed for a minimum of 12 months. Outcomes were assessed using Kujala and Lysholm knee scores, range of motion, patient satisfaction rate, donor-site morbidity, and failure rate. Statistical analysis was performed using SPSS.

Results: Both groups showed significant improvement in functional scores ($p < 0.001$). Group B demonstrated significantly higher postoperative Kujala and Lysholm scores, better patient satisfaction, lower donor-site morbidity, and lower failure rate.

Conclusions: Peroneus longus tendon is a safe, reliable, and effective alternative graft for MPFL reconstruction with superior functional outcomes and patient satisfaction compared to semitendinosus tendon.

Keywords: Kujala and Lysholm score, Medial patellofemoral ligament, Peroneus longus tendon, Semitendinosus tendon

INTRODUCTION

Recurrent dislocation of the patella is a common cause of knee morbidity in young and active individuals. The medial patellofemoral ligament (MPFL) is the primary passive restraint to lateral patellar translation in the first 20-30° of knee flexion, contributing nearly 50-60% of the restraining force. Traumatic patellar dislocation invariably results in disruption of the MPFL, predisposing the patient to recurrent instability if not adequately addressed.^{1,7,10}

MPFL reconstruction has emerged as the standard surgical treatment for recurrent patellar instability in the absence of significant bony malalignment.^{3,7} Various autografts have been described, among which semitendinosus tendon remains the most commonly used.^{6,8}

However, concerns regarding hamstring weakness and donor-site morbidity have prompted evaluation of alternative grafts. The peroneus longus tendon, with its high tensile strength, adequate length, and minimal

functional deficit at the ankle, has been proposed as a viable alternative.⁵

This retrospective study aimed to compare the functional outcomes, complications, and donor-site morbidity of MPFL reconstruction using peroneus longus tendon graft versus semitendinosus tendon graft.

METHODS

This retrospective comparative study was conducted in GSL Medical College and General Hospital, Rajahmundry. A total of 30 patients who underwent MPFL reconstruction for recurrent patellar dislocation between January 2022 and December 2024 were included. Patients were divided into two groups Group A (n=15) as MPFL reconstruction using semitendinosus autograft and Group B (n=15) as MPFL reconstruction using peroneus longus autograft. All surgeries were performed using a standardized technique. Minimum follow-up period was 12 months.

Inclusion criteria

Patients aged between 15 and 40 years with recurrent lateral patellar dislocation (two or more documented episodes) who had failed conservative management were included in the study. Eligible patients had a normal or corrected tibial tubercle-trochlear groove (TT-TG) distance of less than 20 mm and no evidence of advanced trochlear dysplasia, corresponding to Dejour type A or B.

Exclusion criteria

Patients presenting with an acute first-time patellar dislocation, severe trochlear dysplasia (Dejour type C or D), patella alta requiring distalization procedures, associated ligament injuries of the knee, previous knee surgery, or generalized ligamentous laxity were excluded from the study.

Surgical procedure

Group A: Semitendinosus Graft

The patient was positioned supine under spinal or general anesthesia with a thigh tourniquet. The semitendinosus tendon was harvested through a 3-4 cm incision over the pes anserinus. The graft was prepared to a length of approximately 10-12 cm.

A medial patellar incision was made, and a patellar tunnel was drilled at the junction of the upper and middle third of the patella. Femoral tunnel placement was done at the anatomical MPFL insertion (Schöttle point) under fluoroscopic guidance. The graft was passed in an extra-synovial plane and fixed to the patella using interference screw/anchor and to the femur with an interference screw at 30° of knee flexion.



Figure 1: (A) Semitendinosus graft harvesting and preparation, (B) Transpatellar fixation with suture anchors, (C) Fixation of semitendinosus graft to isometric point over medial epicondyle.

Group B: Peroneus Longus Graft

In this group, the peroneus longus tendon was harvested through a small incision posterior to the lateral malleolus. The graft was prepared similarly. The MPFL reconstruction technique, tunnel placement, and fixation method were identical to Group A to eliminate procedural bias. Care was taken to avoid graft over tensioning.

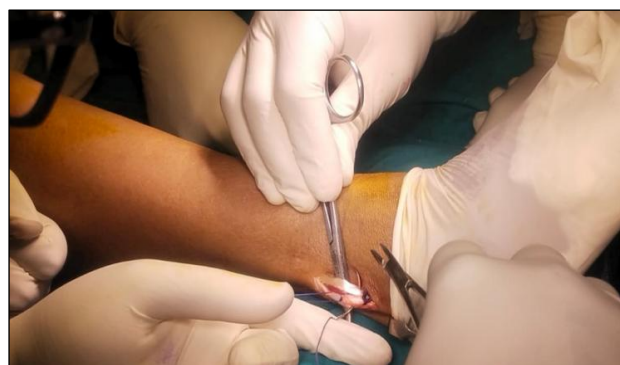


Figure 2: Peroneus longus graft harvesting from lateral malleolus.

Postoperative care and rehabilitation

A standardized postoperative rehabilitation protocol was followed for all patients. A knee immobilizer was applied for the first two weeks after surgery to protect the reconstruction. Quadriceps strengthening exercises were initiated on the first postoperative day, while passive

range-of-motion exercises were commenced after two weeks. Partial weight bearing was allowed from the second postoperative week, progressing to full weight bearing by 4-6 weeks as tolerated. Patients were permitted to resume sports and other high-demand physical activities after 4-6 months, following restoration of adequate muscle strength, knee stability, and functional recovery.

Statistical analysis

Patient data were collected retrospectively from medical records. Clinical outcomes were analyzed and compared between the two groups. The data were compiled and analysed in Statistical package for socialsciences (SPSS) software version 26.0. Quantitative data were described as means and standard deviation. Students t test was done and p value less than 0.05 was considered statistically significant

RESULTS

Demographic profile

The mean age of patients in the semitendinosus graft group was 24.6±4.1 years, while that in the peroneus longus graft group was 23.9±3.8 years. The difference in mean age between the two groups was not statistically significant (p=0.71), indicating that both groups were comparable with respect to age at baseline. This suggests that age was unlikely to have influenced the comparison of postoperative functional outcomes between the two-treatment group (Table 1).

Table 1: Demographic profile (n=15).

Variable	Semitendinosus graft (Group A)	Peroneus longus graft (Group B)	P value
Mean age (years)	24.6±4.1	23.9±3.8	0.71

Intraoperative parameters

The mean operative time was 78±10 minutes in the semitendinosus graft group and 65±8 minutes in the peroneus longus graft group. The reduction in operative time observed with the peroneus longus graft was statistically highly significant (p<0.01) (Table 2).

Similarly, the mean intraoperative blood loss was 120±20 ml in Group A compared with 85±15 ml in Group B. This difference was also statistically highly significant (p<0.01), indicating that MPFL reconstruction using the peroneus longus tendon was associated with significantly less intraoperative blood loss than reconstruction using the semitendinosus tendon (Table 2).

Functional outcome scores

Functional assessment was done using Kujala and Lysholm knee scores preoperatively and at final follow-up (Table 4).

Table 2: Intraoperative parameters (n=15).

Parameter	Semitendinosus graft (Group A)	Peroneus longus graft (Group B)	P value	Significance
Operative time (minutes), Mean±SD	78±10	65±8	<0.01	Highly significant
Intraoperative blood loss (ml), Mean±SD	120±20	85±15	<0.01	Highly significant

Table 3: General parameters.

	Semitendinosus graft	Peroneus longus graft
Tendon length	22-26 cms (average in our study-23.6 cms)	28-32 cms (average -29.2 cms)
Tendon diameter	5-6 mm	4.5 to 5 mm
Tendon strength	~1216-2422 N	~1950-3224 N
Tendon stiffness	~150-200 N/mm	~180-220 N/mm

Table 4: Functional outcome scores.

	Semitendinosus (Group A)	Peroneus longus (Group B)	P value and t score
Pre-op Kujala	54.2±5.8	55.1±5.6	0.62
Post-op Kujala	82.4±4.9	88.6±4.2	<0.001, 3.77
Pre-op Lysholm	52.6±6.4	53.4±6.1	0.68
Post-op Lysholm	80.1±5.7	87.2±4.8	<0.001, 3.67

Range of motion

Full knee range of motion achieved in 86.6% of Group A and 93.3% of Group B ($p=0.48$).

Patient satisfaction

At the final follow-up, patient satisfaction was higher in the peroneus longus graft group than in the semitendinosus graft group. In Group A (semitendinosus graft), 11 of 15 patients (73.3%) reported being satisfied with the surgical outcome, whereas in Group B (peroneus longus graft), 14 of 15 patients (93.3%) were satisfied. This difference was statistically significant ($p=0.04$), indicating greater patient satisfaction among patients who underwent MPFL reconstruction using the peroneus longus tendon autograft.

Donor-site morbidity

Donor-site morbidity was greater in the semitendinosus graft group than in the peroneus longus graft group. Knee flexor weakness was observed in 4 of 15 patients (26.6%) who underwent semitendinosus tendon harvesting (Group A). In contrast, no clinically significant ankle weakness was observed in patients who underwent peroneus longus tendon harvesting (Group B). These findings suggest that harvesting the peroneus longus tendon is associated with minimal donor-site morbidity while preserving ankle function.

Stability

At the final follow-up, no episodes of recurrent patellar dislocation were observed in either the semitendinosus graft group (Group A) or the peroneus longus graft group (Group B), indicating satisfactory restoration of patellar stability in both groups. However, mild patellar apprehension persisted in 2 patients (13.3%) in Group A, whereas no patients in Group B demonstrated residual apprehension.

Complications

No major complications, including patellar fractures or graft failures, were encountered in either group during the follow-up period. One patient (6.7%) in the semitendinosus graft group developed a superficial surgical site infection, which was successfully managed with conservative treatment using antibiotics and regular wound care. No additional postoperative complications were observed in either group.

DISCUSSION

Medial patellofemoral ligament (MPFL) reconstruction has consistently demonstrated excellent clinical outcomes in the management of recurrent patellar instability when anatomical reconstruction principles are followed. The selection of an appropriate graft plays a crucial role in determining postoperative knee function, rehabilitation,

donor-site morbidity, and overall patient satisfaction. Recent advances in graft selection have focused on identifying alternatives that provide adequate biomechanical strength while minimizing donor-site complications.⁷

In the present study, the demographic characteristics of both groups were comparable, with a mean age of 24.6 ± 4.1 years in the semitendinosus group and 23.9 ± 3.8 years in the peroneus longus group, without a statistically significant difference ($p=0.71$). This baseline comparability minimizes the influence of age as a confounding factor and strengthens the validity of the comparison between the two grafts.

Camanho et al demonstrated that anatomical reconstruction of the MPFL following patellar dislocation significantly reduces the recurrence rate and provides superior functional outcomes compared with conservative treatment. Their findings established MPFL reconstruction as the preferred treatment for recurrent patellar instability.⁹ Similar findings were observed in the present study, where no recurrent patellar dislocation was noted in either group during the follow-up period, confirming the effectiveness of anatomical MPFL reconstruction irrespective of the graft used.

Wang et al reported that both single-bundle and double-bundle MPFL reconstruction significantly improve patellar stability, although the double-bundle technique better reproduces the native broad insertion of the MPFL and provides greater resistance to lateral patellar displacement.¹¹ In the present study, both reconstruction techniques restored satisfactory patellar stability; however, mild residual apprehension persisted in 2 patients (13.3%) in the semitendinosus group, whereas no residual apprehension was observed in the peroneus longus group. This finding may indicate improved functional stability with the peroneus longus graft.

Biomechanical characteristics of the graft play an important role in successful ligament reconstruction. Mountney et al. reported that the native MPFL has an ultimate failure load of approximately 178 ± 46 N, while biomechanical studies have shown that the peroneus longus tendon possesses a mean failure load of 322.35 ± 63.18 N, which is comparable to the semitendinosus tendon (334.1 ± 49.0 N) and greater than the gracilis tendon.^{4,10} These biomechanical properties support the use of the peroneus longus tendon as a reliable graft for MPFL reconstruction. In our study, the greater tensile characteristics of the peroneus longus graft were reflected clinically by excellent postoperative stability, superior functional outcomes, and the absence of graft-related complications.

Semitendinosus tendon remains the most widely used autograft because of its ease of harvest, adequate graft length, and proven clinical success. However, previous studies have reported donor-site morbidity in the form of

hamstring weakness, saphenous nerve irritation, and delayed rehabilitation following tendon harvest.^{6,8} Consistent with these reports, our study demonstrated knee flexor weakness in 26.6% of patients undergoing semitendinosus harvest, whereas no clinically significant ankle weakness was observed after peroneus longus harvest. These findings suggest that the peroneus longus tendon may offer the advantage of reduced donor-site morbidity without compromising functional recovery.

The present study also demonstrated significantly improved intraoperative parameters in the peroneus longus group. The mean operative time was significantly shorter (65 ± 8 minutes) compared with the semitendinosus group (78 ± 10 minutes, $p < 0.01$). Similarly, intraoperative blood loss was significantly lower in the peroneus longus group (85 ± 15 ml) than in the semitendinosus group (120 ± 20 ml, $p < 0.01$). These findings indicate that harvesting the peroneus longus tendon is technically simpler and less invasive, contributing to shorter surgical duration and reduced intraoperative morbidity.

Functional outcome assessment demonstrated significant improvement in both groups following surgery. However, patients reconstructed with the peroneus longus graft achieved significantly better postoperative Kujala scores (88.6 ± 4.2 vs. 82.4 ± 4.9 ; $p < 0.001$) and Lysholm scores (87.2 ± 4.8 vs. 80.1 ± 5.7 ; $p < 0.001$) than those reconstructed with the semitendinosus graft. These findings indicate superior restoration of patellofemoral function, reduced pain, and improved knee performance with the peroneus longus graft.

Han et al compared autologous peroneus longus tendon and semitendinosus tendon for MPFL reconstruction and reported that both grafts effectively restored patellar stability, significantly improved Kujala scores, corrected patellar tilt and congruence angles, and delayed degenerative changes of the patellofemoral joint. Although both grafts produced satisfactory outcomes, the peroneus longus graft demonstrated equivalent or superior functional recovery with minimal donor-site morbidity.⁵ Our findings closely parallel those observations, as patients reconstructed with the peroneus longus graft achieved superior functional scores together with fewer donor-site complications.

Range of motion is another important indicator of successful rehabilitation. In the present study, full knee range of motion was achieved in 93.3% of patients in the peroneus longus group compared with 86.6% in the semitendinosus group, although this difference was not statistically significant ($p = 0.48$). These findings suggest that both grafts permit satisfactory postoperative rehabilitation, while the peroneus longus graft may facilitate slightly earlier functional recovery.

Patient satisfaction represents an important patient-reported outcome following ligament reconstruction. In our study, 93.3% of patients in the peroneus longus group

reported satisfaction compared with 73.3% in the semitendinosus group ($p = 0.04$). The significantly higher satisfaction observed with the peroneus longus graft is likely attributable to better functional recovery, lower donor-site morbidity, shorter operative time, and reduced postoperative discomfort.

The complication profile further supports the safety of both techniques. No patellar fractures, graft failures, or recurrent instability were observed in either group. Only one patient in the semitendinosus group developed a superficial wound infection, which resolved with conservative treatment. These findings indicate that both grafts are safe for MPFL reconstruction, although the lower donor-site morbidity associated with the peroneus longus graft provides an additional clinical advantage.

Overall, the findings of the present study are consistent with recent comparative studies demonstrating that the peroneus longus tendon is a reliable alternative autograft for MPFL reconstruction.^{5,6} The graft offers excellent biomechanical strength, shorter operative time, reduced blood loss, superior postoperative functional outcomes, minimal donor-site morbidity, and greater patient satisfaction while maintaining equivalent patellar stability. These advantages make the peroneus longus tendon an attractive graft option, particularly in young and active individuals requiring MPFL reconstruction.

The present study has certain limitations. Its retrospective design makes it susceptible to selection bias and dependence on the accuracy and completeness of medical records, while randomization and blinding were not possible. The relatively small sample size, with 15 patients in each group, limits the statistical power and generalizability of the findings. The minimum follow-up period of 12 months may be insufficient to assess long-term graft survivorship, late instability, or degenerative changes. In addition, knee flexor and ankle evor strength were assessed clinically rather than objectively using isokinetic dynamometry. Finally, the single-center design may limit external validity, as the findings could be influenced by institutional surgical expertise and rehabilitation protocols.

CONCLUSION

Both semitendinosus and peroneus longus grafts provide good to excellent outcomes in MPFL reconstruction for recurrent patellar dislocation. However, peroneus longus graft demonstrated superior functional scores with minimal donor-site morbidity and no knee flexor weakness. It is a safe, effective, and promising alternative to semitendinosus tendon for MPFL reconstruction.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Nomura E, Horiuchi Y, Inoue M. Correlation of MR imaging findings and open exploration of medial patellofemoral ligament injuries in acute patellar dislocations. *Knee*. 2002;9(2):139-43.
2. Dejour D, Saggin P. The sulcus deepening trochleoplasty-the Lyon's procedure. *Int Orthop*. 2010;34(2):311-6.
3. Ellera Gomes JL. Medial patellofemoral ligament reconstruction for recurrent dislocation of the patella: a preliminary report. *Arthrosc*. 1992;8(3):335-40.
4. Mountney J, Senavongse W, Amis AA, Thomas NP. Tensile strength of the medial patellofemoral ligament before and after repair or reconstruction. *J Bone Joint Surg Br*. 2005;87(1):36-40.
5. Han M, Zhang Q, Chen W, Zhang S, Zhang W, Mou L, et al. Reconstruction of the medial patellofemoral ligament with autologous peroneal longus tendon versus semitendinosus tendon. *Int Orthop*. 2022;46:1341-9.
6. Migliorini F, Trivellas A, Driessen A, Quack V, Tingart M, Eschweiler J, et al. Graft choice for isolated MPFL reconstruction: gracilis versus semitendinosus. *Eur J Orthop Surg Traumatol*. 2020;30(5):763-70.
7. Kyung HS, Kim HJ. Medial patellofemoral ligament reconstruction: a comprehensive review. *Knee Surg Relat Res*. 2015;27(3):133-40.
8. Wylie JD, Burks RT. Medial patellofemoral ligament reconstruction with semitendinosus autograft. *Arthrosc Tech*. 2013;2(4):e417-21.
9. Camanho GL, de Christo Viegas A, Bitar AC, Demange MK, Hernandez AJ. Conservative versus surgical treatment for repair of the medial patellofemoral ligament in acute dislocations of the patella. *Arthrosc*. 2009;25(6):620-5.
10. LaPrade MD, Kallenbach SL, Aman ZS, Moatshe G, Storaci HW, Turnbull TL, et al. Biomechanical evaluation of the medial stabilizers of the patella. *Am J Sports Med*. 2018;46(7):1575-1582.
11. Wang Q, Huang W, Cai D, Huang H. Biomechanical comparison of single- and double-bundle medialpatellofemoral ligament reconstruction. *J Orthop Surg Res*. 2017;12(1):29.

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