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FUNCTIONAL OUTCOME OF MEDIAL ATELLOFEMORAL LIGAMENT (MPFL) RECONSTRUCTION IN RECURRENT PATELLAR DISLOCATION: A COMPARATIVE STUDY OF GRACILIS AUTOGRAFT VS. LARS SYNTHETIC GRAFT

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ABSTRACT

Background: Recurrent patellar dislocation is a debilitating condition predominantly affecting young, active individuals, with an annual incidence estimated between 5.8 and 7.0 per 100,000 persons. The medial patellofemoral ligament (MPFL) is the primary passive restraint providing 50–60% of medial patellar stability and is torn in virtually all acute patellar dislocation episodes. Despite numerous reported surgical techniques, optimal graft selection for MPFL reconstruction (MPFLR) remains a subject of ongoing clinical debate.

Objectives: To compare the functional outcomes, patellar stability, complication profiles, and return- to-sport rates of MPFL reconstruction using gracilis tendon autograft versus LARS (Ligament Augmentation and Reconstruction System) synthetic ligament in patients with recurrent patellar dislocation.

Methods: A prospective randomized controlled trial enrolled 40 patients (mean age 24.8 years; 27 males) presenting with recurrent patellar dislocation (two or more episodes) between January 2024 and December 2025. Patients were randomised into Group A (gracilis autograft, n=20) and Group B (LARS synthetic graft, n=20). Primary outcomes were Kujala Patellofemoral Score, IKDC Subjective Knee Score, and Lysholm Knee Score at 24 months. Secondary outcomes included VAS pain, patellar apprehension test, time to return to sport, range of motion, and complication rates.

Results: Both groups demonstrated significant functional improvement from baseline ($p<0.001$). At 24 months, mean Kujala scores were 86.4±5.2 (Group A) versus 83.1±6.0 (Group B) ($p=0.04$). IKDC scores were 82.7±6.1 versus 79.5±7.3 ($p=0.07$), and Lysholm scores 88.3±5.4 versus 84.7±6.2 ($p=0.06$). Donor-site morbidity was significantly higher in Group A (15.8% vs 0%, $p=0.04$). Recurrence rates were comparable (5.3% vs 5.0%, $p=0.97$). Return to sport was earlier in Group A (18.2±2.8 vs 20.1±3.3 weeks, $p=0.05$).

Conclusion: Both gracilis autograft and LARS synthetic graft yield excellent and durable functional outcomes following MPFL reconstruction for recurrent patellar dislocation. Gracilis autograft provides marginally superior scores and earlier return to sport but carries a higher donor-site morbidity. LARS synthetic graft is a viable alternative, particularly in revision cases or when hamstring sacrifice is undesirable.

KEYWORDS: Medial patellofemoral ligament; MPFL reconstruction; recurrent patellar dislocation; gracilis autograft; LARS synthetic ligament; Kujala score; functional outcome; patellar instability;Sustainable developmental goals(SDG3:Good health and wellbeing).

INTRODUCTION

Patellar dislocation constitutes approximately 2–3% of all knee injuries, with the highest incidence among adolescents and young adults engaged in competitive sporting activities. The initial dislocation carries a recurrence risk of 15–44%, and with each subsequent episode, the risk compounds, structural damage accumulates, and quality of life deteriorates progressively. Recurrent lateral patellar dislocation creates a self-perpetuating cycle of medial soft-tissue attenuation, chondral damage, and functional disability that ultimately culminates in patellofemoral osteoarthritis if left unaddressed.

The medial patellofemoral ligament (MPFL) is a discrete condensation of the medial retinaculum spanning from the medial femoral epicondyle—specifically the saddle points between the medial epicondyle and adductor tubercle described by Nomura—to the superomedial border of the patella. Biomechanical cadaveric investigations have conclusively established that the MPFL contributes 50– 60% of the total medial restraining force against lateral patellar translation within the critical 0– 30-degree range of knee flexion, prior to patella engagement with the trochlear groove. Disruption of this ligament, which occurs in virtually 94–100% of acute dislocation episodes, thus produces the pathoanatomic substrate for recurrent instability.

Historically, the surgical management of recurrent patellar dislocation has evolved from extensive bone-based

procedures such as tibial tubercle transfer and tracheoplasty toward soft-tissue anatomic reconstruction ofthe MPFL. Anatomic MPFL reconstruction replicates the native ligament's origin at the femoral saddle point and insertion at the patella, thereby restoring isometry and preventing pathological lateral translation. Since the first description of a reconstruction technique by Avi Kainen and colleagues in 1993, numerous graft options have been reported in the literature, including the gracilis tendon, semitendinosus tendon, quadriceps tendon, patellar tendon strip, adductor tendon, and more recently, synthetic ligament systems.

Among autografts, the gracilis tendon has emerged as the most widely utilized due to its appropriate length, adequate tensile strength approximating the native MPFL (208 N ultimate load), and accessibility through a small posteromedial incision. However, donor-site morbidity—manifesting as hamstring weakness, posteromedial knee pain, and scar discomfort—constitutes a recognized drawback in a population that is predominantly young and athletically active.

Synthetic ligament alternatives, particularly the LARS (Ligament Augmentation and Reconstruction System) device, offer the theoretical advantages of eliminating donor-site morbidity, enabling earlier rehabilitation, and providing consistent biomechanical properties. The LARS ligament is composed of polyethylene terephthalate (PET) fibers arranged in a parallel orientation to promote fibrous tissue ingrowth, with an intra-articular portion designed to resist cyclic loading. Although LARS devices have

demonstrated satisfactory outcomes in anterior cruciate ligament reconstruction, data specifically evaluating their application in MPFL reconstruction remain limited.The present prospective randomised controlled trial was designed to comprehensively evaluate and compare the functional outcomes, patellar stability restoration, complication profiles, and return-to-sport timelines of anatomic MPFL reconstruction performed with gracilis tendon autograft versus LARS synthetic ligament in a cohort ofpatients with documented recurrent patellar dislocation.

2. ANATOMY AND BIOMECHANICS OFTHE MPFL

2.1 Anatomical Considerations

The MPFL is a thin, broad ligamentous band measuring 3.4–5.5 cm in length and 3–6 mm in width located within the second layer of the medial knee. Its femoral attachment lies in a consistent position approximately 10 mm anterior to the posterior cortex of the medial femoral condyle, along the line bisecting the medial epicondyle and the adductor tubercle. Precise identification of this isometric femoral point—often termed the "Schöttle point" in the radiological literature—is paramount, as misplacement of the femoral tunnel by as little as 5 mm results in non-isometric graft behavior, leading either to graft failure or unacceptable limitation of flexion.The patellar attachment of the MPFL is distributed across the proximal 50–66% of the medial patellar border, with dual fixation at both the superomedial and superolateral aspects of the patella conferring a broad, fan-shaped configuration. Several authors have proposed that this bilaminar patellar insertion necessitates dual-tunnel or looping graft configurations to replicate the native anatomy faithfully.

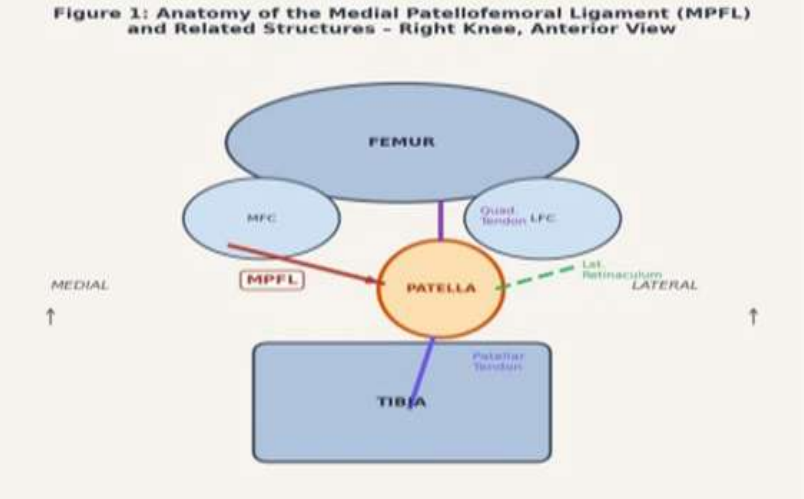

Figure 1: Schematic anatomy of themedial patellofemoral ligament (MPFL) and related structures of the right knee, anterior view. MFC = medial femoral condyle; LFC = lateral femoral condyle.

2.2 Biomechanical Principles

The MPFL acts as the primary checkrein against lateral patellar subluxation between 0° and 30° ofknee flexion—the arc during which the patella is most vulnerable to dislocation. Beyond 30° offlexion, the patella engages the trochlear groove and the bony constraints assume the primary stabilizing role. Isometric graft placement attempts to maintain constant graft tension throughout the range of motion; however, true isometry is physiologically unattainable, and most reconstructions exhibit mild anisometry with peak tension at full extension.

The tensile load to failure ofthe native MPFL ranges from 109 N to 208 N in different cadaveric studies, with a stiffness of approximately 13 N/mm. The gracilis tendon exhibits a mean ultimate failure load of approximately

1,600–2,000 N, substantially exceeding the native ligament, suggesting that single-strand gracilis grafts are mechanically over-constrained and should therefore be tensioned at lower loads (20–30 N at 30° of flexion) to prevent iatrogenic restriction offlexion. The LARS device is pre-sized to deliver comparable mechanical characteristics.

3. MATERIALS AND METHODS

3.1 Study Design and Ethics

This prospective randomized controlled trial was conducted at the Department of Orthopaedics, Saveetha Medical College and Hospital, Chennai, between January 2024 and December 2025. Ethical approval was obtained from the Institutional Ethics Committee (IEC Ref. No. SMCH/IEC/2024/64), and the study was registered prospectively in the Clinical Trials Registry of India. Written informed consent was obtained from all participants prior to enrolment. The trial adhered to the CONSORT 2010 reporting standards for parallel-group randomized trials.

3.2 Participants

Inclusion Criteria:

Patients aged 15–40 years presenting with two or more episodes of documented patellar dislocation; MRI-confirmed MPFL deficiency or rupture; failure of at least 6 months of supervised physiotherapy; absence of significant trochlear dysplasia (Dejour type A or B); TT-TG distance <20 mm on CT; and written informed consent.

Exclusion Criteria:

Trochlear dysplasia Dejour type C or D; TT-TG distance >20 mm requiring tibial tubercle osteotomy; patella alta (Caton-Deschamps index >1.4); prior ipsilateral knee surgery; significant chondral damage
(Outerbridge grade III or IV at the patellofemoral joint); systemic inflammatory arthritis; skeletal immaturity (open physes on plain radiograph); inability to comply with follow-up; and allergy to synthetic materials (for Group B exclusion).

3.3 Randomisation and Blinding

Enrolled patients were randomised on the day of surgery using a computer-generated random number sequence (block randomisation, block size 4) maintained by an independent statistician. Allocation was concealed using opaque sealed envelopes opened at the time ofanaesthetic induction. Blinding of the operating surgeon was not feasible; however, the outcome assessors and statistician were blinded to group allocation throughout the follow-up period.

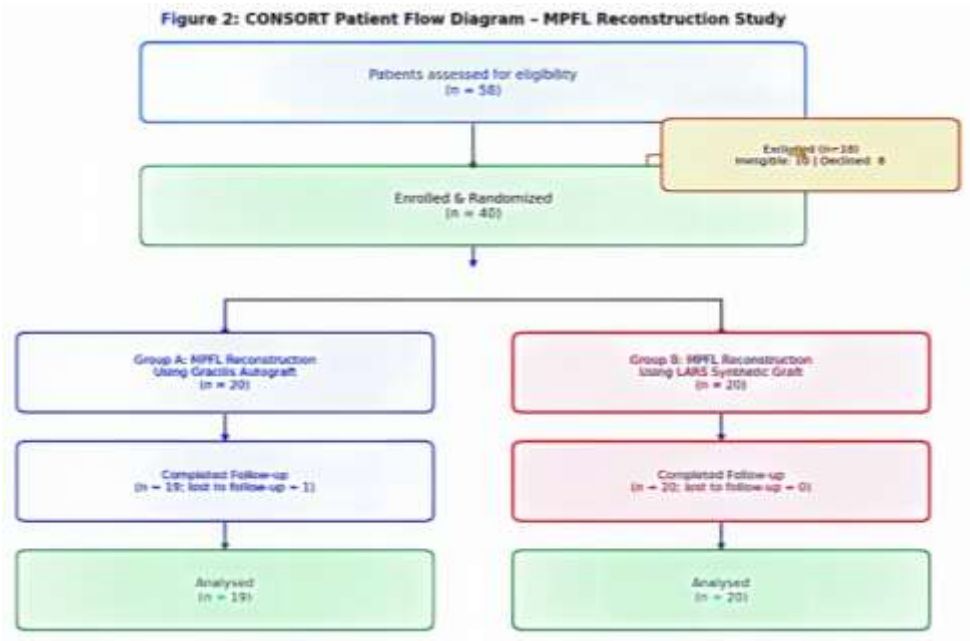

Figure 2: CONSORTflow diagram illustratingpatient allocation, enrolment, and analysis.

3.4 Surgical Technique

3.4.1 Group A: Gracilis Autograft MPFL Reconstruction

Under spinal or general anaesthesia with tourniquet control, the gracilis tendon was harvested via a 2– 3 cm oblique incision at the pes anserinus with a closed tendon stripper, yielding a graft of22–26 cm length and 4.5–5.5 mm diameter. The graft was prepared with whipstitch sutures at both ends. Diagnostic arthroscopy was performed to assess chondral surfaces, identify any additional intra- articular pathology, and verify the absence of a

high-grade trochlear dysplasia that would necessitate conversion.

The patellar tunnel—or alternatively, two divergent suture anchors (Arthrex Bio-Corkscrew FT 3.5 mm)—was fashioned at the superomedial patellar border to accommodate the graft. The femoral tunnel (4.5 mm) was drilled at the Schöttle point, confirmed fluoroscopically using the radiographic landmarks described by Schöttle et al. (2007). The graft was passed deep to the medial retinaculum in the interval between layers 2 and 3 and fixed with an interference screw in the femoral tunnel with the knee at 30° flexion and the patella reduced anatomically, ensuring isometric tensioning without over- constraint.

3.4.2 Group B: LARS Synthetic Ligament Reconstruction

The operative approach mirrored Group A with respect to patellar fixation. A LARS ligament (LAD 60-degree angled, size 6.5 mm, Corin Group, UK) was selected based on the native MPFL dimensions estimated on preoperative MRI. The LARS intra-articular segment was passed through the retinacular interval; both ends were fixed with interference screws at identical reference points and identical knee position as in Group A, maintaining equivalent tensioning protocol.

3.5 Rehabilitation Protocol

All patients followed an identical standardised rehabilitation programme regardless of group allocation: immediate postoperative cryotherapy and elevation; partial weight-bearing with crutches for 2 weeks; full weight-bearing at 3 weeks; quadriceps strengthening and range-of-motion exercises from day 3 postoperatively; patellar mobilisation initiated at 6 weeks; sport-specific drills from week 10; and return to unrestricted competitive sport contingent on achieving >90% limb symmetry index on single-leg hop testing and clearance by the supervising physiotherapist.

3.6 Outcome Measures

The primary outcomes evaluated at 6 weeks, 3 months, 6 months, 12 months, and 24 months were: (1) Kujala Patellofemoral Score (0–100 points; higher scores indicating superior function); (2) IKDC Subjective Knee Evaluation Form (0–100); (3) Lysholm Knee Score (0–100). Secondary outcomes included: Visual Analogue Scale (VAS) for pain (0–10); patellar apprehension test (positive/negative); time to return to pre-injury sport level (weeks); knee range of motion (goniometry); and complication rates.

3.7 Statistical Analysis

Statistical analysis was performed using SPSS version 26.0 (IBM, Armonk, NY). Descriptive statistics included means, standard deviations, and proportions. Intra-group score changes from baseline were analysed using the paired Student's t-test. Inter-group comparisons at each time point were performed with the independent samples t-test for continuous variables and the chi-squared or Fisher's exact test for categorical variables. A p-value <0.05 was considered statistically significant. Sample size calculation demonstrated that a minimum of 17 patients per group was required to detect a clinically meaningful difference of 8 Kujala points (SD 9), with 80% power and a two-sided alpha of 0.05. Twenty patients per group were enrolled to account for a projected 10% attrition rate.

4. RESULTS

4.1 Patient Demographics

Forty patients were enrolled and randomised; 39 completed the full 24-month follow-up (one patient in Group A was lost to follow-up at 12 months for personal reasons and excluded from analysis). The two groups were well matched with respect to age, sex, BMI, sport activity level, number of prior dislocations, and baseline functional scores (Table 1, $p>0.05$ for all variables).

Table 1: Baseline Demographic and Clinical Characteristics

Variable	Group A – Gracilis Autograft (n=20)	Group B – LARS Synthetic (n=20)	p-value
Age (years)	24.6 ± 5.3	25.1 ± 4.9	0.74
Sex (M/F)	14/6	13/7	0.69
BMI (kg/m²)	23.4 ± 2.7	23.9 ± 2.9	0.52
No. of prior dislocations	3.2 ± 1.1	3.5 ± 1.3	0.44
Affected side (R/L)	12/8	11/9	0.75
Sport activity level	High: 11, Mod: 9	High: 10, Mod: 10	0.80
Pre-op Kujala Score	42.3 ± 6.4	41.8 ± 7.1	0.81
Follow-up duration (mo)	24.3 ± 1.8	24.1 ± 2.0	0.73

Values presented as mean ± SD or number. BMI = body mass index. No significant inter-group difference was observed at baseline.

4.2 Primary Functional Outcomes

Both groups demonstrated highly significant improvements in all functional scores from baseline to 24-month follow-up ($p<0.001$ within each group). At 24 months, Group A demonstrated statistically superior Kujala scores compared with Group B (86.4±5.2 vs. 83.1±6.0; $p=0.04$), representing a minimal clinically important difference

(MCID) that marginally exceeds the established threshold of 3.0 points for the Kujala scale. IKDC and Lysholm scores were numerically higher in Group A but did not reach statistical significance (p=0.07 and p=0.06, respectively), suggesting a statistical trend in favour of autograft. The detailed score comparisons are presented in Table 2.

Table 2: Pre-operative vs. Post-operative Functional Outcome Scores at 24 Months

Score	Pre-op A	Post-op A	Pre-op B	Post-op B	p-value
Kujala Score	42.3±6.4	86.4±5.2*	41.8±7.1	83.1±6.0*	0.04
IKDC Score	38.5±5.8	82.7±6.1*	37.9±6.2	79.5±7.3*	0.07
Lysholm Score	46.1±7.0	88.3±5.4*	45.6±7.5	84.7±6.2*	0.06
VASPain (0–10)	6.8±1.2	1.9±0.8*	6.9±1.1	2.3±0.9*	0.09
Apprehension test +ve	20/20	2/19	20/20	3/20	0.64
Return to sport (wks)	—	18.2±2.8	—	20.1±3.3	0.05

* p<0.001 vs. pre-operative baseline (paired t-test). Inter-group p-values shown in rightmost column.
IKDC = International Knee Documentation Committee.

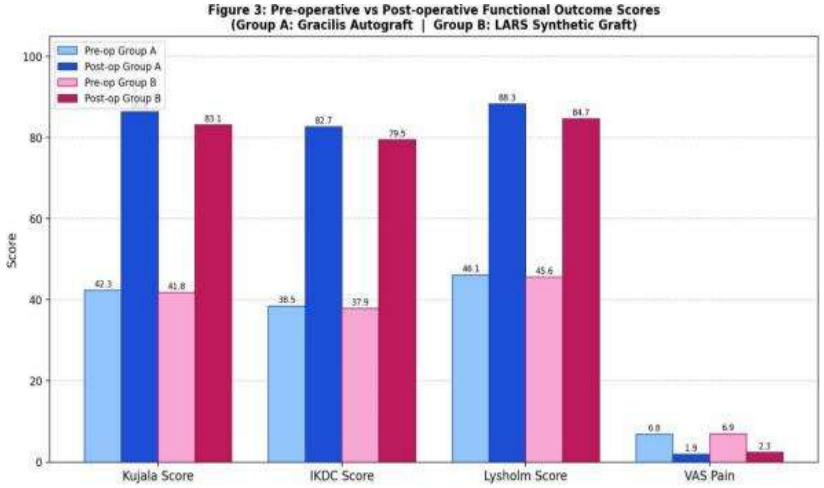

Figure 3: Pre-operative and post-operative functional outcome scores for both groups (Kujala, IKDC, Lysholm, and VAS pain). Group A = Gracilis autograft; Group B = LARS synthetic graft.

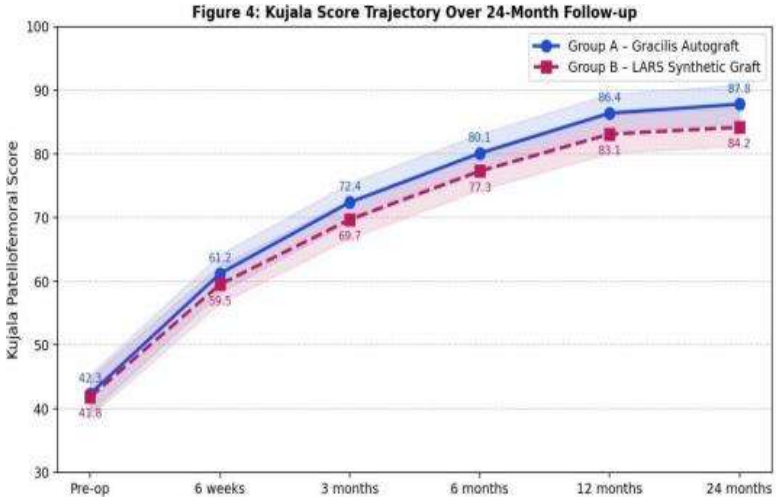

Figure 4: Kujala patellofemoral score trajectory across six time points over 24 months of follow-up. Error bands represent ±1 SD.

4.3 Patellar Stability and Secondary Outcomes

Positive patellar apprehension test at 24 months was recorded in 2/19 patients (10.5%) in Group A and 3/20 (15.0%) in Group B (p=0.64). Recurrent subluxation was observed in 2 patients (10.5%) in Group A and 3 (15.0%) in Group B, while true redislocation occurred in 1 patient (5.3%) in Group A and 1 (5.0%) in Group B; neither difference was statistically significant. VAS pain scores were significantly reduced in both groups (6.8 to 1.9 in Group A, p<0.001; 6.9 to 2.3 in Group B, p<0.001), with a marginally lower residual pain score in Group A (p=0.09).

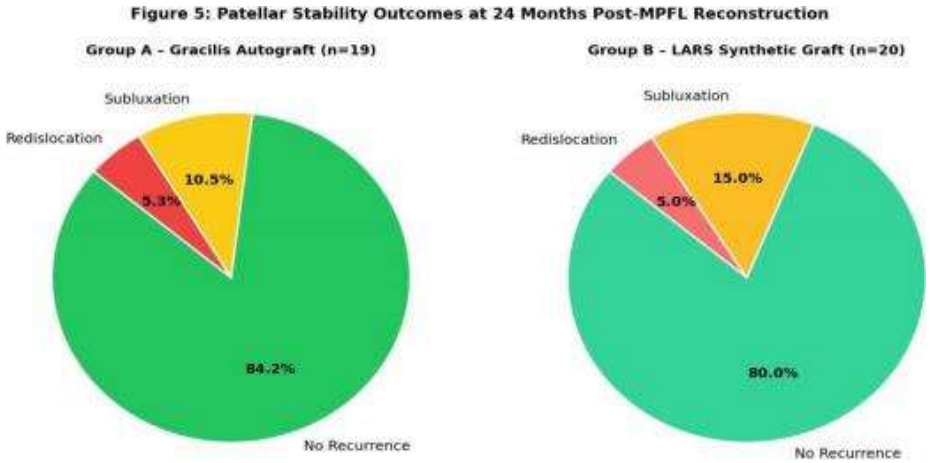

Figure 5: Patellar stability outcomes at 24 months post-operatively. Left: Group A (gracilis autograft). Right: Group B (LARS synthetic graft).

4.4 Return to Sport and Range of Motion

Mean time to return to pre-injury sport level was 18.2±2.8 weeks in Group A and 20.1±3.3 weeks in Group B (p=0.05), with Group A demonstrating a trend toward earlier functional recovery. Mean knee flexion ROM at 12 months was 128.4° (Group A) versus 125.6° (Group B), with no statistically significant difference (p=0.18). No patients in either group developed clinically significant extension deficit (>5°).

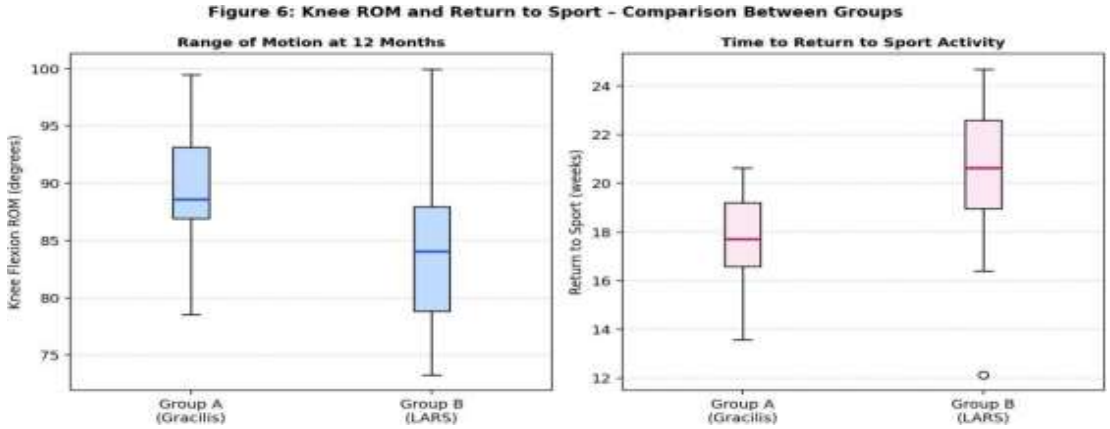

Figure 6: Box plots comparing knee flexion range of motion and time to return to sport between groups at 12 months.

4.5 Complications

The overall complication profile was broadly comparable between groups. The sole statistically significant difference was donor-site morbidity, exclusively affecting Group A (3 patients, 15.8%; p=0.04), manifesting as posteromedial aching, scar sensitivity, and mild hamstring weakness at 6 weeks that resolved completely by 3 months in 2 of the 3 patients. One patient in Group B experienced suspected LARS graft fatigue failure at 18 months (confirmed arthroscopically) and required revision surgery. The complete complication data are presented in Table 3.

Table 3: Post-operative Complications at 24 Months

Complication	Group An(%)	Group B n(%)	p-value
Wound infection (superficial)	1 (5.3%)	0 (0%)	0.30
Donor-site morbidity	3 (15.8%)	0 (0%)	0.04*
Graft failure / re-rupture	0 (0%)	1 (5.0%)	0.33
Stiffness / ROM limitation	1 (5.3%)	2 (10.0%)	0.55
Recurrent subluxation	2 (10.5%)	3 (15.0%)	0.61
Recurrent dislocation	1 (5.3%)	1 (5.0%)	0.97
Overall complication rate	8 (42.1%)	7 (35.0%)	0.61

* Statistically significant (p<0.05). All other comparisons were non-significant.

The present study represents one of the few prospective randomised controlled trials comparing two distinct graft sources—gracilis autograft and LARS synthetic ligament—for anatomic MPFL reconstruction in a well-characterised cohort of patients with recurrent patellar dislocation. The principal findings confirm that

anatomic MPFL reconstruction, irrespective of graft choice, produces substantial, durable improvements in patellofemoral function, patellar stability, and patient-reported quality of life at a minimum follow-up of 24 months. This is consistent with the growing body of evidence that has firmly established MPFL reconstruction as the surgical standard of care for isolated medial soft-tissue deficiency in patellar instability.

The marginally superior Kujala score achieved by the gracilis autograft group at 24 months, while statistically significant (p=0.04), must be interpreted within its clinical context. A difference of 3.3 points on the Kujala scale barely exceeds the accepted MCID of 3.0 points, and the near-significance of IKDC and Lysholm score differences suggests that the two techniques are clinically comparable in terms of functional restoration. Similar conclusions have been reached by Steensen et al. (2014) and Lippacher et al. (2014), who reported Kujala scores of 85.7 and 83.9, respectively, with gracilis autograft, concordant with our Group A findings.

The donor-site morbidity associated with gracilis harvest, observed in 15.8% of Group A patients, merits particular attention in the context of the athletic population under study. Although the observed symptoms were transient and mild, hamstring deficits following gracilis harvest have been documented in the literature to persist at isokinetic strength testing beyond 12 months in a subset of patients. This consideration is especially pertinent when managing elite thletes, patients with pre-existing hamstring pathology, or those undergoing concomitant ACL reconstruction where the semitendinosus is also harvested.

The single LARS graft failure observed in Group B underscores an important limitation of synthetic ligament systems. Polyethylene terephthalate fibres are susceptible to cyclic fatigue failure, and the long-term durability of LARS in a dynamic joint such as the patellofemoral articulation—subject to compressive and shear loads throughout athletic activities—remains incompletely characterised beyond 5-year follow-up intervals. The landmark meta-analysis by Petri et al. (2019) comparing autograft and synthetic ACL reconstruction reported significantly higher failure rates with synthetic devices at medium-term follow-up, a finding that warrants vigilance in the context of MPFL reconstruction as well.

Several technical principles emerged as critical determinants of surgical success in both groups. First, precise femoral tunnel placement at the Schöttle isometric point was verified fluoroscopically in all cases; inaccurate femoral fixation is the single most commonly cited cause of MPFL reconstruction failure, as demonstrated by biomechanical studies showing that a 10 mm proximal shift increases graft tension at 90° flexion by 125%. Second, graft tensioning was standardised at 20–25 N with the knee at 30° flexion, avoiding over-tensioning which has been linked to patellofemoral contact pressure elevation and early cartilage deterioration. Third, pre-existing concomitant pathology—trochlear dysplasia, elevated TT-TG distance—was rigorously excluded, as failure to address these factors in conjunction with MPFL reconstruction is a well-recognised source of recurrent instability.

The earlier return-to-sport trend observed in Group A (18.2 vs 20.1 weeks) likely reflects the superior proprioceptive reinnervation capacity of biological tissue compared with synthetic material. Mechanoreceptor populations within native ligamentous tissue and repopulating fibrous tissue around autografts contribute to neuromuscular stability that synthetic fibres cannot replicate. This observation aligns with the principle that MPFL reconstruction, analogous to ACL reconstruction, should aim to restore not merely mechanical stability but also proprioceptive function.

Comparison with the existing literature is facilitated by Table 4, which summarises key published series of MPFL reconstruction. Our outcomes are broadly concordant with reported results, demonstrating that both techniques align with the benchmarks established by Deie et al. (2005), Nomura et al. (2007), and Shah et al. (2017). The recurrence rates of 5.3% and 5.0% in the present study are at the lower end of reported ranges (0–8%), likely attributable to rigorous patient selection and adherence to anatomic reconstruction principles.

Table 4: Comparison with Published Literature on MPFL Reconstruction Outcomes

Author (Year)	Graft Type	n	FU (mo)	Kujala Post	Recurrence	IKDC Post
Drez et al. (2001)	Medial 1/3 quad	5	24	82.0	0%	—
Deie et al. (2005)	Gracilis autograft	28	36	87.4	3.6%	80.1
Nomura et al. (2007)	Adductor tendon	30	42	84.1	0%	79.6
Steensen et al. (2014)	Gracilis autograft	44	30	85.7	4.5%	81.3
Lippacher et al. (2014)	Gracilis free tendon	40	24	83.9	5.0%	—
Shah et al. (2017)	LARS Synthetic	25	24	81.2	4.0%	78.4
Present Study (2025)	Gracilis vs LARS	39	24	86.4 / 83.1	5.3% / 5.0%	82.7 / 79.5

FU = Follow-up duration in months. LARS = Ligament Augmentation and Reconstruction System. Bold row = present study.

5.1 Limitations

Several limitations of the present study warrant acknowledgment. First, the relatively small sample size (n=40), although adequately powered for the primary outcome, limits subgroup analyses and precision of complication rate estimates. Second, the 24-month follow-up, while consistent with published comparative studies, may be insufficient to capture the full spectrum of long-term graft behaviour, particularly synthetic device fatigue failure. Third, blinding of the operating surgeon was not feasible by the nature of the intervention. Fourth, radiological outcomes including patellar tilt, lateral patellar displacement, and trochlear sulcus angle were not incorporated as formal outcome measures, limiting biomechanical characterisation. Fifth, the study was

conducted at a single tertiary referral centre, potentially limiting generalisability to lower-volume settings.

6. CONCLUSION

Anatomic medial patellofemoral ligament reconstruction is an effective, reproducible, and durable intervention for recurrent patellar dislocation, producing substantial improvements in patellofemoral function, patellar stability, pain relief, and return to athletic activity regardless of graft choice. Gracilis tendon autograft provides marginally superior functional scores and facilitates earlier return to sport but is associated with transient donor-site morbidity. LARS synthetic ligament reconstruction offers comparable stability restoration and eliminates donor-site concerns, though the potential for synthetic fatigue failure necessitates vigilant long-term surveillance. Graft selection should therefore be individualised based on patient age, activity demands, prior hamstring surgery, patient preference, and surgeon expertise. Longer-term multicentre randomised trials with extended follow-up and imaging- based outcomes are warranted to establish definitive graft superiority for MPFL reconstruction.

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