International Journal of Medicine
pISSN 1468-3814 | eISSN 2667-7008
https://theinternationalmedicine.com/

Original Researcher Article DOI: 10.61336/im/26-2-46

Comparative Study Of Functional Outcome Of Arthroscopic ACL Reconstruction Using Hamstring Versus Peroneus Longus Graft

[1] Dr Shivendra Singh, [2] Dr Narendra Pratap Singh, [3] Dr Prakash Jha
[1]Associate Professor, Hind Institute of Medical Sciences, Sitapur, U.P
[2]Associate Professor, Hind Institute of Medical Sciences, Sitapur, U.P
[3]Assistant Professor, Hind Institute of Medical Sciences, Sitapur, U.P

Correspondence:
Dr Shivendra Singh

Received: January 01, 2026
Revised: January 15, 2026
Accepted: February 09, 2026
Published: February 20, 2026

Abstract

Introduction – Anterior cruciate ligament (ACL) reconstruction improves knee stability and function with many graft types, either autografts or allografts, which have already been studied extensively. ***Material and methods-*** This prospective comparative study was conducted on 100 patients undergoing arthroscopic ACL reconstruction at a tertiary care center. Patients were randomly allocated into two groups: Group H (hamstring tendon graft, n = 50) and Group P (peroneus longus tendon graft, n = 50). Functional outcomes were assessed using the Lysholm knee score and International Knee Documentation Committee (IKDC) score preoperatively and at 6 weeks, 3 months, and 6 months postoperatively. ***Results –*** Both groups showed significant improvement in Lysholm and IKDC scores over the follow-up period ($p < 0.001$ within groups). At 6 months, the mean Lysholm score was 92.1 ± 4.8 in Group H and 93.6 ± 4.5 in Group P, while the mean IKDC score was 90.3 ± 5.1 and 91.8 ± 4.9, respectively. No statistically significant difference was observed between the two groups at any follow-up interval ($p > 0.05$). Radiological evaluation showed satisfactory graft positioning in all cases, and postoperative complications were minimal, with no cases of graft failure or ankle instability. ***Conclusion-*** Peroneus longus tendon autograft provides functional outcomes comparable to hamstring tendon autograft in ACL reconstruction with minimal donor site morbidity. It represents a safe and effective alternative graft option, particularly when hamstring tendons are inadequate or need to be preserved.

Keywords: anterior cruciate ligament reconstruction, hamstring tendon grafts, orthopaedics, peroneus longus tendon graft

INTRODUCTION

Knee stability is mainly provided by ligaments and involves the cruciate ligaments. The anterior cruciate ligament (ACL) and posterior cruciate ligament are the most important ones.[1] ACL plays an important role in stabilizing knee joints against translational and rotational forces. ACL tear may lead to knee instability, meniscus tear, and subsequent osteoarthritis.[2] ACL reconstruction is a common procedure in orthopedics surgery.[3,4]

ACL reconstruction can be performed using a variety of different surgical techniques as well as different graft materials.[5] Nowadays, bone-patellar tendon-bone (BPTB) and four-strand hamstring (HS) autografts are the two most common autografts used for ACL reconstruction and each has its advantages and disadvantages.[5-7] Although the BPTB autograft has been a gold standard, 40-60% of patients who have undergone ACL reconstruction using patellar tendon autograft have an anterior knee problem that can jeopardize the activity for the patients, who spend a lot of time on their knee for culture and job.[7,8] Quadrupled HS has become an increasingly popular alternative autograft and recent reports indicate less donor morbidity; however, the HS harvest medially can damage the saphenous nerve and could potentially lead to instability of the medial knee joint if ACL rupture accompanied by medial collateral ligament injury.[8,9] An ideal autograft should have an acceptable amount of strength, and size and be easily and safely harvested.[8] Surgical site infection may occur in patients with skin and soft-tissue injury in the area of pes anserine insertion from where the medial HS graft is harvested. In addition, another feasible autograft would be useful in revision situations or as a supplement to other autograft choices.[8]

Recently, the peroneus longus tendon (PLT) for regular ACLR has been under investigation as a potential graft of choice. There is also no risk of post-op hamstring muscle weakness or injury to the saphenous nerve during graft retrieval. As the PLT has good biomechanical properties and a high load-to-failure strength [10], its use as a graft for ACLR is prevailing among orthopaedic

surgeons [11]. Studies have reported that the peroneus brevis tendon (PBT) is a more competent ankle evertor [12], justifying the harvest of PLT as far as ankle evertor functions are concerned. Moreover, PL has already been used for other ligament reconstructions and cruciate ligament reconstructions in multiligamentous injuries.

The purpose of our study is to compare the functional outcome between the peroneus longus tendon and hamstring tendon in ACL Reconstruction.

MATERIALS AND METHODS

The present cross sectional study was conducted at department of Orthopedics of a tertiary care centre for a period of one year among patients of ACL reconstruction. Ethical clearance for conducting the research was taken for institutional ethics committee of college and hospital before conducting the research. Informed consent was taken from patients after explaining them about the study.

Through consecutive sampling a total of 100 patients who visited to department of ACL reconstruction were selected for the study on the basis of inclusion and exclusion criteria. Patients were than randomly divided into two groups
Group H: (n=50) patients who received hamstring graft
Group P : (n=50) patients who received Peroneus Longus

Inclusion criteria-

1. Patients with clinical /MRI evidence of symptomatic individuals with anterior cruciate ligament insufficiency.
2. Patients between age 18 to 60 years (skeletally matured patients)
3. Patients with no history of previous surgery in the knee and a normal contralateral knee

Exclusion Criteria-

1. Patients with systemic diseases compromising their pre anaesthetic fitness.
2. Patients associated with PCL tear or associated Grade III MCL and LCL injuries.
3. Patients with osteoarthritic knee / Cartilage injury.
4. Patients with associated fracture of tibial plateau.
5. Patients with local skin infections.
6. Patients unwilling to give consent.

All patients had OT profiles and PAC fitness tests after admission. During preoperative planning, a knee radiograph, MRI scan, and implant selection were conducted. All patients underwent surgery under spinal or combination spinal-epidural anesthesia, with tourniquets in place. Intravenous antibiotics were administered 1 hour before surgery and continued until the second post-operative day. Oral antibiotics were continued until suture removal on the 13th post-operative day. All patients had typical arthroscopy procedures. Ipsilateral leg peroneus tendon was extracted. Incision was 2-3 cm above and 1 cm behind lateral malleolus. Upon dissection, the Peroneus longus and brevis tendon were discovered, stripping and preparing the longus.

After surgery, patients were urged to use an active knee ROM from POD-1 and provided a lengthy knee brace for weight bearing from the following day. All patients learned static and dynamic quadriceps strengthening. Post operation dressing was used on days 2 and 5, and sutures were removed on day 13. Walking with a knee brace continued for 3 weeks post-op. At the 2-week post-operative follow-up, the patient had sutures removed and knee range of motion assessed. After 6 weeks, 3 months, and 6 months, functional scores were obtained using the Lysholm knee score, IKDC score, and ap and lateral plain x-ray of the afflicted knee.

The results were reported as the mean value plus or minus the standard error of the mean (SEM), or as a number or median, depending on the situation. Comparisons between the two groups were conducted using Fischer's test or Chi-square test, depending on the suitable circumstances. A significance level of $P < 0.05$ was used to determine statistical significance.

RESULTS

Table 1 shows demographic Characteristics of Study Participants. The demographic parameters of both groups were comparable at baseline. The mean age of patients in Group H was 29.6 ± 6.8 years, while that in Group P was 30.1 ± 7.2 years, with no statistically significant difference (p = 0.68). Males constituted the majority of patients in both groups, accounting for 76% in Group H and 72% in Group P (p = 0.64). The side of injury was also similarly distributed, with right-sided involvement seen in 56% of Group H and 60% of Group P patients (p = 0.69). These findings indicate adequate baseline comparability between the two groups.

Table 2 shows comparison of Mean Lysholm Knee Scores at Follow-up. The mean preoperative Lysholm knee score was 52.4 ± 8.9 in Group H and 53.1 ± 9.2 in Group P, with no statistically significant difference (p = 0.71). At 6 weeks, the mean Lysholm score improved to 72.6 ± 7.8 in Group H and 74.1 ± 7.5 in Group P (p = 0.29). Further improvement was observed at 3 months, with mean scores of 85.3 ± 6.4 and 87.0 ± 6.1, respectively (p = 0.18). At the final 6-month follow-up, Group H achieved a mean score of 92.1 ± 4.8, while Group P achieved 93.6 ± 4.5, with no statistically significant intergroup difference (p = 0.12).

Table 1 Demographic Characteristics of Study Participants

Variable	Group H (Hamstring) (n = 50)	Group P (Peroneus Longus) (n = 50)	p value
Mean age (years) ± SD	29.6 ± 6.8	30.1 ± 7.2	0.68
Age range (years)	18–55	19–58	–
Male	38 (76%)	36 (72%)	0.64
Female	12 (24%)	14 (28%)	
Side involved – Right	28 (56%)	30 (60%)	0.69
Side involved – Left	22 (44%)	20 (40%)	

Table 2 Comparison of Mean Lysholm Knee Scores at Follow-up

Follow-up Interval	Group H (Hamstring) Mean ± SD	Group P (Peroneus Longus) Mean ± SD	p value
Preoperative	52.4 ± 8.9	53.1 ± 9.2	0.71
6 weeks	72.6 ± 7.8	74.1 ± 7.5	0.29
3 months	85.3 ± 6.4	87.0 ± 6.1	0.18
6 months	92.1 ± 4.8	93.6 ± 4.5	0.12

Table 3 shows comparison of Mean IKDC Scores at Follow-up. The preoperative IKDC score was 48.7 ± 9.6 in Group H and 49.4 ± 10.1 in Group P, with no significant difference between groups (p = 0.74). Both groups showed consistent improvement in IKDC scores throughout the follow-up period. At 6 weeks, the mean IKDC score was 68.9 ± 8.2 in Group H and 70.5 ± 7.9 in Group P (p = 0.31). At 3 months, scores further improved to 82.4 ± 6.7 and 84.2 ± 6.5, respectively (p = 0.17). At 6 months, the mean IKDC score reached 90.3 ± 5.1 in the hamstring group and 91.8 ± 4.9 in the peroneus longus group, with the difference remaining statistically insignificant (p = 0.14).

Table 3 Comparison of Mean IKDC Scores at Follow-up

Follow-up Interval	Group H (Hamstring) Mean ± SD	Group P (Peroneus Longus) Mean ± SD	p value
Preoperative	48.7 ± 9.6	49.4 ± 10.1	0.74
6 weeks	68.9 ± 8.2	70.5 ± 7.9	0.31
3 months	82.4 ± 6.7	84.2 ± 6.5	0.17
6 months	90.3 ± 5.1	91.8 ± 4.9	0.14

Table 4 shows postoperative complications in both groups. One patient (2%) in Group H developed a superficial surgical site infection, which resolved with conservative management. Knee stiffness was observed in one patient (2%) from each group. Donor site morbidity was reported in 2 patients (4%) in Group H and 1 patient (2%) in Group P. No cases of graft failure, deep infection, or ankle instability were noted during the follow-up period.

Table 4. Postoperative Complications

Complication	Group H (n = 50)	Group P (n = 50)
Superficial infection	1 (2%)	0
Deep infection	0	0
Graft failure	0	0
Knee stiffness	1 (2%)	1 (2%)
Donor site morbidity	2 (4%)	1 (2%)
Ankle instability	–	0

Table 5 shows Functional Outcome Based on Lysholm Score at 6 Months. At the final 6-month assessment based on Lysholm score grading, excellent outcomes were achieved in 38 patients (76%) in Group H and 41 patients (82%) in Group P. The remaining patients demonstrated good outcomes, with no cases classified as fair or poor in either group.

Table 5 Final Functional Outcome Based on Lysholm Score at 6 Months

Outcome Category	Score Range	Group H (n = 50)	Group P (n = 50)
Excellent	> 90	38 (76%)	41 (82%)
Good	84–90	12 (24%)	9 (18%)
Fair	65–83	0	0
Poor	< 65	0	0

DISCUSSION

Knee injuries leading to ACL tears are commonly seen in contact sports and sometimes in road traffic accidents or domestic injuries. ACL tear leads to knee instability, degeneration of the knee joint, and other complications. Hence, the reconstruction of ACL is of utmost significance in preventing these secondary complications. Its reconstruction has been tried with various methods including autografts, xenografts, and composite materials. The autografts are usually done by harvesting from different tendons such as the HS tendon, patellar tendons, and of late with PL tendon. Recent studies evaluating the usefulness of the PL tendon for ACL repair have found it to be promising and useful. The present study was done to add to the scientific evidence toward comparing the repair of ACL by HS and repair with peroneus longus tendon by comparing two known and validated knee scores.

Both groups showed significant improvement in functional scores over time, as evidenced by progressive increases in Lysholm and IKDC scores from the preoperative period to the final 6-month follow-up. This improvement reflects effective restoration of knee stability and function following ACL reconstruction, irrespective of graft choice.

Keyhani et al [13] in their study comprising of 130 patients compared functional outcome of peroneus longus vs hamstring graft in ACLR and found no significant difference in clinical outcome and knee stability. Some studies found that peroneus longus tendon graft was more superior because it provides larger graft diameter and less thigh hypotrophy with excellent ankle function.[14,15] Bi et al [16] compared the use of single-bundle anterior half of PLT vs. semitendinosus tendon. At the 2-year follow up, the study found no differences between both groups in the VAS scale, IKDC score, pivot shift test, and KT 1000. Besides, the AOFAS score in the PLT group was more excellent than the semitendinosus tendon group. This finding concluded that PLT graft provides greater strength and relatively safe for reconstruction. Trung et al [17] reported that ACLR using anterior half peroneus longus tendon graft showed no complications in ankle and foot post-surgery. Another study revealed enhancement on knee functionality based on the Lysholm, leaving no ankle functionality differences.[18]

In our study donor site morbidity was minimal in both groups. While a slightly higher incidence was observed in the hamstring group, the difference was not clinically significant. The absence of major complications such as graft rupture, deep infection, or persistent stiffness in either group highlights the overall safety and effectiveness of ACL reconstruction using either autograft.

In a study conducted by Reddy KS et al., 6 (24%) patients complained of knee stiffness and 1 (4%) patient required arthroscopic debridement due to infection. In Group-P, 1 (4%) patient complained of knee stiffness and 1 (4%) patient required arthroscopic debridement due to infection. The incidence of knee stiffness was comparable between the two groups and similarly, the incidence of requirement of arthroscopic debridement was also comparable between the two groups. The postoperative complication rate between the two groups were comparable.[19] Study conducted by Karthikeyan M et al., found that 4 (20%) patients complained of knee stiffness and 1 (5%) patient required arthroscopic debridement due to infection. In Group-P, 1 (5%) patient complained of knee stiffness and 1 (5%) patient required arthroscopic debridement due to infection. The incidence of knee stiffness was comparable between the two groups and similarly, the incidence of requirement of arthroscopic debridement was also comparable between the two groups.

Despite these encouraging results, the study has certain limitations. The follow-up duration was limited to six months, which may not fully capture long-term graft survival, functional outcomes, or late complications such as osteoarthritis. Additionally, objective strength testing of the hamstring and ankle musculature was not performed, which could have provided further insight into donor site morbidity. The study was conducted at a single center with a relatively modest sample size, which may limit generalizability.

CONCLUSION

After arthroscopic anterior cruciate ligament restoration, both hamstring tendon and peroneus longus tendon autografts produced acceptable and comparable functional results. Both groups' Lysholm and IKDC scores significantly improved during the 6-month follow-up period. There was no discernible difference between the two transplants in terms of radiological results or functional recovery. Donor site morbidity and postoperative consequences were negligible and similar. Crucially, there was no clinically significant ankle instability following the harvesting of the peroneus longus tendon. These results imply that a safe and efficient substitute for the hamstring tendon in ACL restoration is the peroneus longus tendon. It is advised to do longer-term research to assess long-term functional results.

REFERENCES

1. Marimuthu K, Joshi N, Sharma M, Sharma CS, Bhargava R, Rajawat AS, et al. Anterior cruciate ligament reconstruction using the medial third of the patellar tendon. J Orthop Surg (Hong Kong) 2011;19:221-5.
2. Edgar CM, Zimmer S, Kakar S, Jones H, Schepsis AA. Prospective comparison of auto and allograft hamstring tendon constructs for ACL reconstruction. Clin Orthop Relat Res 2008;466:2238-46.

3. Shaerf DA, Pastides PS, Sarraf KM, Willis-Owen CA. Anterior cruciate ligament reconstruction best practice: A review of graft choice. World J Orthop 2014;5:23-9.
4. Iorio R, Vadalà A, Argento G, Di Sanzo V, Ferretti A. Bone tunnel enlargement after ACL reconstruction using autologous hamstring tendons: A CT study. Int Orthop 2007;31:49-55.
5. Ahn JH, Lee SH. Anterior cruciate ligament double-bundle reconstruction with hamstring tendon autografts. Arthroscopy 2007;23:109.e1-4.
6. Rhatomy S, Asikin AI, Wardani AE, Rukmoyo T, Lumban-Gaol I, Budhiparama NC. Peroneus longus autograft can be recommended as a superior graft to hamstring tendon in single-bundle ACL reconstruction. Knee Surg Sport Traumatol Arthrosc 2019;27:3552-9.
7. Angthong C, Chernchujit B, Apivatgaroon A, Chaijenkit K, Nualon P, Suchao-in K. The anterior cruciate ligament reconstruction with the peroneus longus tendon: A biomechanical and clinical evaluation of the Donor Ankle morbidity. J Med Assoc Thai 2015;98:555-60.
8. Shi FD, Hess DE, Zuo JZ, Liu SJ, Wang XC, Zhang Y, et al. Peroneus longus tendon autograft is a safe and effective alternative for anterior cruciate ligament reconstruction. J Knee Surg 2019;32:804-11.
9. Joyce CD, Randall KL, Mariscalco MW, Magnussen RA, Flanigan DC. Bone-patellar tendon-bone versus soft-tissue allograft for anterior cruciate ligament reconstruction: A systematic review. Arthroscopy 2016;32:394-402.
10. Kerimoğlu S, Aynaci O, Saraçoğlu M, Aydin H, Turhan AU. Anterior cruciate ligament reconstruction with the peroneus longus tendon [Article in Turkish]. Acta Orthop Traumatol Turc. 2008, 42:38-43.
11. Williams BR, Ellis SJ, Deyer TW, Pavlov H, Deland JT. Reconstruction of the spring ligament using a peroneus longus autograft tendon transfer. Foot Ankle Int. 2010, 31:567-77.
12. Otis JC, Deland JT, Lee S, Gordon J. Peroneus brevis is a more effective evertor than peroneus longus . Foot Ankle Int. 2004; 25:242-6.
13. Keyhani S, Qoreishi M, Mousavi M, Ronaghi H, Soleymanha M. Peroneus Longus Tendon Autograft versus Hamstring Tendon Autograft in Anterior Cruciate Ligament Reconstruction: A Comparative Study with a Mean Follow-up of Two Years. Arch Bone Jt Surg. 2022 Aug;10(8):695-701.
14. Rhatomy S, Asikin AIZ, Wardani AE, Rukmoyo T, Gaol I. Lumban, Budhiparama N.C. Peroneus longus autograft can be recommended as a superior graft to hamstring tendon in single-bundle ACL reconstruction. Knee Surg. Sports Traumatol. Arthrosc. 2019;27(11):3552–3559.
15. Ertogrul E, Varol A, Oc Y, Kilinc BE. Is peroneus longus allograft good alternative for anterior cruciate ligament reconstruction: a comparison study. Acta Chir. Orthop. Traumatol. Cechoslov. 2021;88(1):58–62.
16. Bi M, Zhao C, Zhang S, Yao B, Hong Z, Bi Q. All-inside single-bundle reconstruction of the anterior cruciate ligament with the anterior half of the peroneus longus tendon compared to the semitendinosus tendon: a two year follow up study. J. Knee Surg. 2018;31(10):1022–1030
17. Trung DT, Manh SL, Thanh LN, Dinh TC, Dinh T. Preliminary result of arthroscopic anterior cruciate ligament reconstruction using anterior half of peroneus longus tendon autograft. Open. Access. Maced. J. Med. Sci. 2019;7(24):4351–4356.
18. Cao H, Liang J, Xin JY. Treatment of anterior cruciate ligament injury with peroneus longus tendon. Natl. Med. J. China. 2012;92(35):2460–2462.
19. Reddy KS, Keerthi N, Sarvani KK. Functional Outcome Between Peroneus Longus Vs Hamstring Graft in an ACL Reconstruction. European Journal of Cardiovascular Medicine. 2023 Oct 30;13:2346-51.
20. Karthikeyan M, Valavan M. Comparative Study Of Functional Outcome Of ACL Reconstruction With Arthroscopic Two Strands And Four Strands Hamstring Autograft. Frontiers in Health Informatics. 2024 Apr 1;13(3).