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Functional Outcome of the Ankle After Harvesting Peroneus Longus Tendon for Arthroscopic Anterior Cruciate Ligament Reconstruction

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ABSTRACT

Background: The peroneus longus tendon is increasingly used as an autograft option for anterior cruciate ligament (ACL) reconstruction. However, concerns remain regarding donor site morbidity, particularly ankle eversion and first ray plantarflexion strength.
Aim: To determine donor site morbidity post acquiring the peroneus longus tendon for arthroscopic ACL reconstruction.
Methods: A retrospective cohort study was conducted among 50 patients who underwent primary arthroscopic ACL reconstruction using peroneus longus tendon autograft. After completing 6 months of postoperative rehabilitation, patients were assessed for ankle eversion and first ray plantarflexion strength using a push–pull dynamometer (measured in Newtons).
Measurements were compared with preoperative values. Statistical analysis was done using paired t-test with significance set at $p < 0.05$.
Results: The mean preoperative plantarflexion strength was 70.50 ± 7.05 N and postoperative strength was 70.18 ± 7.16 N ($p = 0.028$).
The mean preoperative eversion strength was 45.76 ± 5.61 N and postoperative strength was 45.48 ± 5.62 N ($p = 0.029$). Although statistically significant, the absolute differences were minimal and clinically insignificant.
Conclusion: Harvesting the peroneus longus tendon for arthroscopic ACL reconstruction does not result in clinically meaningful donor site morbidity in terms of ankle eversion and plantarflexion strength.

Keywords: ACL reconstruction, Peroneus longus tendon, Donor site morbidity, Ankle eversion strength, Plantarflexion strength.

INTRODUCTION

Anterior cruciate ligament (ACL) injury is one of the most common ligament injuries of the knee, with an incidence of 68.6 per 100,000 person-years.[1] Surgical reconstruction is the standard treatment for symptomatic instability in active individuals.

Common graft options include bone–patellar tendon–bone (BTB), hamstring tendon (semitendinosus and gracilis), quadriceps tendon, and more recently, the peroneus longus tendon.[2] The peroneus longus graft offers adequate length, favourable biomechanical properties, and ease of harvest without tourniquet.

Despite these advantages, concerns remain regarding donor site morbidity, particularly potential weakness in ankle eversion and first ray plantarflexion. Previous studies have suggested minimal functional deficit following peroneus longus harvest.[3–5]

This study aims to evaluate donor site morbidity by comparing preoperative and postoperative ankle strength parameters using the push pull dynamometer.

MATERIALS AND METHODS

A cohort study was conducted on 50 patients who underwent primary arthroscopic anterior cruciate ligament (ACL) reconstruction using a peroneus longus tendon autograft at our institution over three year period. Patients aged between 18 and 50 years who completed a minimum follow-up of six months after surgery were included in the study. Patients with multi-ligament knee injuries, revision ACL reconstruction, associated meniscal or chondral injuries, fractures around the knee, or those outside the specified age group were excluded. All procedures were performed under spinal anaesthesia. The peroneus longus tendon was harvested through a posterolateral incision approximately 3 cm proximal to the lateral malleolus and prepared as the graft. Arthroscopic ACL reconstruction was then carried out with femoral fixation using an Endo button and tibial fixation using a bio-interference screw. After six months postoperatively, donor site morbidity was assessed by measuring ankle eversion strength and first ray plantarflexion strength in Newtons using a push–pull dynamometer. Statistical analysis was performed using SPSS software. Continuous variables were expressed as mean ± standard deviation, and comparisons were made using a paired t-test, with a p-value <0.05 considered statistically significant.

RESULTS

A total of 50 patients who underwent primary arthroscopic anterior cruciate ligament (ACL) reconstruction using a peroneus longus tendon autograft were included in the study.

The age distribution of the study participants showed that the majority of patients belonged to the 31–40 years age group (44%), followed by the 21–30 years group (34%). Patients aged 41–50 years constituted 16% of the sample, while the least represented group was 18–20 years (6%) (Table 1). Overall, 84% of the participants were below 40 years of age.

Sex distribution revealed a predominance of male patients. Among the 50 participants, 40 (80%) were males and 10 (20%) were females (Table 2).

Comparison of plantar flexion strength before and after harvesting of the peroneus longus tendon demonstrated minimal change. The mean preoperative plantar flexion strength was 70.50 ± 7.05 N, while the postoperative value was 70.18 ± 7.16 N. The mean difference was 0.32 N. Paired sample analysis showed a statistically significant difference ($p = 0.028$); however, the magnitude of change was minimal and not clinically significant (Table 3).

Similarly, ankle eversion strength showed comparable values before and after tendon harvesting. The mean preoperative eversion strength was 45.76 ± 5.61 N and the postoperative value was 45.48 ± 5.62 N. The mean difference was 0.28 N. Although the difference was statistically significant ($p = 0.029$), the change was very small and unlikely to be clinically meaningful (Table 4).

Overall, these findings indicate that harvesting of the peroneus longus tendon for ACL reconstruction does not result in clinically significant impairment of ankle eversion or plantar flexion strength.

Table 1: Age Distribution of Study Participants

AGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
	18 - 20 years	3	6.0	6.0	6.0
	21 - 30 years	17	34.0	34.0	40.0
Valid	31 - 40 years	22	44.0	44.0	84.0
	41 - 50 years	8	16.0	16.0	100.0
	Total	50	100.0	100.0	

Table 2: Sex Distribution of Study Participants

SEX					
		Frequency	Percent	Valid Percent	Cumulative Percent
	F	10	20.0	20.0	20.0
Valid	M	40	80.0	80.0	100.0
	Total	50	100.0	100.0	

Table 3: Comparison of Preoperative and Postoperative Plantar Flexion Strength Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
PRE OP PLANTAR	70.50	50	7.054	.998

FLEXION IN POWER OF					
NEWTON Pair 1 POST OP PLANTAR	70.18	50	7.165	1.013	
FLEXION IN POWER OF					
NEWTON					

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE OP PLANTAR FLEXION IN POWER OF NEWTON & POST OP PLANTAR FLEXION IN POWER OF NEWTON	50	.990	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PRE OP PLANTAR FLEXION IN POWER OF NEWTON - POST OP PLANTAR FLEXION IN POWER OF NEWTON	.320	.999	.141	.036	.604	2.266	49	.028

Table 4: Comparison of Preoperative and Postoperative Eversion Strength Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
PREOP EVERSION IN	45.76	50	5.612	.794
POWER OF NEWTON Pair 1 POST OP EVERSION IN	45.48	50	5.618	.794
POWER OF NEWTON				

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PREOP EVERSION IN POWER OF NEWTON & POST OP EVERSION IN POWER OF NEWTON	50	.988	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PREOP EVERSION IN POWER OF NEWTON -POST OP EVERSION IN POWER OF NEWTON	.280	.882	.125	.029	.531	2.246	49	.029

Table 5 : Demographic data

S.NO	AGE	SEX	PRE-OP PLANTAR FLEXION	POST-OP PLANTAR FLEXION	PRE-OP EVERSION	POST-OP EVERSION

			IN POWER OF NEWTON(N)	IN POWER OF NEWTON(N)	IN POWER OF NEWTON(N)	IN POWER OF NEWTON(N)
1.	42	F	78	78	55	55
2.	22	F	81	81	48	48
3.	23	M	71	71	40	40
4.	29	M	77	77	44	44
5.	29	M	65	65	46	46
6.	42	M	54	52	39	36
7.	35	F	70	70	55	55
8.	23	M	69	69	57	57
9.	25	M	65	65	48	48
10.	18	M	77	77	44	44
11.	19	M	79	79	49	49
12.	24	M	58	58	46	46
13.	33	M	61	61	39	39
14.	36	M	74	70	55	51
15.	28	M	66	66	48	48
16.	37	F	69	69	40	40
17.	42	M	74	74	44	44
18.	24	M	77	77	46	46
19.	25	F	72	72	39	39
20.	32	M	64	64	55	55
21.	36	M	70	70	40	40
22.	35	F	57	54	43	40
23.	26	M	72	72	44	44
24.	43	F	75	75	46	46
25.	35	M	77	77	38	38
26.	41	M	69	69	55	55
27.	21	M	65	65	48	48
28.	32	M	77	73	40	38
29.	35	M	75	75	44	44
30.	37	M	71	71	46	46
31.	20	M	74	74	39	39
32.	35	M	68	68	52	52
33.	40	F	78	78	45	45
34.	49	M	77	77	55	55
35.	21	M	71	71	48	48
36.	26	M	81	81	40	40
37.	35	M	55	55	44	44
38.	41	M	71	71	55	55
39.	28	M	78	78	48	48
40.	40	M	65	65	40	40
41.	33	M	59	59	44	44
42.	30	M	70	70	46	46
43.	36	M	58	58	39	39
44.	43	M	77	74	56	54
45.	33	M	76	76	47	47
46.	40	M	65	65	42	42
47.	28	F	71	71	43	43
48.	35	F	78	78	46	46
49.	40	M	77	77	40	40
50.	36	M	67	67	38	38



Figure 1: Push-Pull Dynanometer



Figure 2 : Checking Pre-op Plantar flexion and Eversion power



Figure 3 : Checking 6 months Post-op Plantar flexion and Eversion power

DISCUSSION

The choice of graft in anterior cruciate ligament (ACL) reconstruction is increasingly guided not only by biomechanical strength but also by the extent of donor site morbidity. In this study, harvesting the peroneus longus tendon resulted in statistically detectable but clinically negligible reductions in ankle eversion and first ray plantarflexion strength at 6 months postoperatively.

The observed mean reduction in plantarflexion (0.32 N) and eversion strength (0.28 N) represents less than 1% of baseline values. From a functional perspective, this magnitude of difference is unlikely to influence gait mechanics, push-off power, or athletic performance. Similar findings have been reported in previous investigations evaluating ankle function following peroneus longus harvest.[3–6]

The peroneus longus contributes to ankle eversion, plantarflexion of the first ray, and maintenance of the medial longitudinal arch.[7] However, biomechanical redundancy exists within the lateral compartment of the leg. The preserved peroneus brevis muscle provides substantial compensatory eversion strength, which may explain the minimal functional deficit observed in our cohort. This compensation has also been emphasized in cadaveric and clinical studies evaluating lateral ankle biomechanics.[8,9]

Wicaksono et al.[3] demonstrated comparable eversion and plantarflexion strength between donor and contralateral sides after peroneus longus harvest. Rhatomy et al.[4] similarly reported preserved ankle function without measurable instability.

In a comparative study, Keyhani et al.[2] found no significant difference in functional outcomes between peroneus longus and hamstring grafts, suggesting equivalence in knee stability with minimal ankle morbidity.

Additional case series have supported the safety profile of this graft option.[5],[10]
When compared to traditional grafts, the peroneus longus tendon appears advantageous in terms of donor site morbidity. Bone–patellar tendon–bone grafts are associated with anterior knee pain, patellar fracture risk, and kneeling discomfort.[11] Hamstring grafts may result in decreased knee flexion strength and altered hamstring–quadriceps ratio.[12] These limitations have prompted exploration of alternative autografts that preserve periarticular muscle strength.

Biomechanically, the tensile strength of the peroneus longus tendon has been reported to be comparable to semitendinosus grafts and sufficient for ACL reconstruction.[13],[14] Moreover, adequate graft diameter can often be achieved with single-tendon harvest, potentially reducing surgical time and preserving additional musculotendinous structures.

An important distinction must be made between statistical and clinical significance. With adequate sample size, even minimal differences may yield statistically significant p-values. However, clinical decision-making should rely on effect size and functional relevance. In the present study, the extremely small absolute difference suggests that ankle function remains preserved in practical terms. No patient reported subjective instability or difficulty in daily activities attributable to donor site weakness.

The demographic pattern in our study, with predominance of males in the third and fourth decades, mirrors epidemiological trends of ACL injuries described in large population-based analyses.[1] This enhances the generalizability of our findings to the most affected patient population.

Nevertheless, certain limitations should be acknowledged. The retrospective design introduces potential selection bias. The follow-up duration was limited to 6 months, which may not capture long-term adaptive neuromuscular changes. Objective gait analysis, isokinetic dynamometry, and validated ankle-specific patient-reported outcome measures could provide more comprehensive assessment in future studies. Prospective randomized trials comparing peroneus longus, hamstring, and BTB grafts with long-term follow-up are warranted.

Overall, accumulating evidence—including our findings—suggests that peroneus longus tendon autograft provides adequate graft strength while maintaining ankle function with minimal clinically relevant morbidity. This supports its consideration as a reliable alternative graft in primary ACL reconstruction.

CONCLUSION

Harvesting of the peroneus longus tendon for anterior cruciate ligament (ACL) reconstruction did not result in a significant reduction in ankle eversion strength or first ray plantarflexion strength at six months follow-up, indicating minimal donor site morbidity. These findings suggest that the peroneus longus tendon can be considered a safe and effective alternative autograft option for primary ACL reconstruction. Further studies with larger sample sizes, multicenter participation, and longer follow-up periods are recommended to validate these findings.

REFERENCES

1. Sanders TL, Maradit Kremers H, Bryan AJ, Larson DR, Dahm DL, Levy BA, et al. Incidence of anterior cruciate ligament tears and reconstruction: a 21-year population-based study. Am J Sports Med. 2016;44(6):1502–7.
2. 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;10(8):695–701.
3. Wicaksono FH, Rhatomy S, Budipharama NC. Ankle eversion and first ray plantar flexion muscle strength after peroneus longus tendon harvest for anterior cruciate ligament reconstruction. Orthop J Sports Med. 2020;8(5 Suppl 5):2325967120S00071.
4. Rhatomy S, Wicaksono FH, Soekarno NR. Functional outcomes following peroneus longus tendon harvest in ACL reconstruction. J Orthop Surg. 2020;28(3):2309499020946845.
5. Wiradiputra AE, Febyan. Peroneus longus tendon graft for anterior cruciate ligament reconstruction: a case report and review of literature. Int J Surg Case Rep. 2021;85:106028.
6. Kerimoğlu S, Aynaci O, Saraçoğlu M, Aydin H. Peroneus longus tendon autograft for ACL reconstruction: Clinical and functional results. Knee Surg Sports Traumatol Arthrosc. 2008;16:699-703.
7. Neumann DA. Kinesiology of the musculoskeletal system: Foundations for rehabilitation. 3rd ed. St Louis: Elsevier; 2017.
8. Sobel M, Bohne WH, Markisz JA. The role of the peroneal tendons in lateral ankle stability. Foot Ankle. 1990;11:161-5.

9. 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.
10. Zhao J, Huangfu X. Biomechanical and clinical evaluation of peroneus longus tendon autograft for ACL reconstruction. Arthroscopy. 2012;28:1553-9.
11. Kartus J, Movin T, Karlsson J. Donor-site morbidity and anterior knee problems after ACL reconstruction using bone–patellar tendon–bone autograft. Knee Surg Sports Traumatol Arthrosc. 2001;9:318-24.
12. Tashiro T, Kurosawa H, Kawakami A, Hikita A, Fukui N. Influence of hamstring tendon harvest on knee flexion strength after ACL reconstruction. Am J Sports Med. 2003;31:522-9.
13. Rhatomy S, Asikin AI, Wardani AE, Budhiparama NC. Tensile strength comparison between peroneus longus and hamstring tendon grafts. Orthop J Sports Med. 2019;7:2325967119841461.
14. Bi M, Zhao C, Zhang S, Yao Z. Biomechanical properties of peroneus longus tendon for ACL reconstruction: An in vitro study. J Orthop Res. 2018;36:1913-9.