Adding a Lateral Extra-Articular Tenodesis to Anterior Cruciate Ligament Reconstruction does Influence Quadriceps and Hamstring Strength recovery

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Research

Clinical Care

Education

Conflict of interest

- The authors declare no conflict of interest

Introduction

The patients who undergo Anterior Cruciate Ligament reconstruction (ACLR) should delay return to sport if they have not recovered muscle strength after surgery. Adjunct surgical procedures with ACLR such as the Lateral Extraarticular Tenodesis (LET) adds knee stability but potentially can delay recovery in strength. We wanted to study whether adding an LET to ACLR affects strength recovery after surgery. This has not been well studied.

Objectives

The aim of this study is to compare quadriceps and hamstring muscles strength recovery between patients who underwent isolated ACLR versus patients underwent ACLR with LET.

Methods

All patients who underwent primary hamstring autograft ACLR from 2021 were studied. We excluded all patients who underwent revision ACLR and multiligament reconstructions. The patients were divided into two groups; patients underwent ACLR only (Group 1), and ACLR with LET (Group 2). All patients underwent Biodex isokinetic dynamometer assessment for knee extensors and flexors strength at six and twelve months after the surgery. Both sets of patients underwent the same rehabilitation programme after surgery. Patient details such as age, weight, height, number and duration of physiotherapy sessions were recorded.

Results

A total of 65 patients included in the study; 19 patients underwent ACLR only (Group 1), 46 patients underwent ACLR with LET (Group 2). Patients in the ACLR with LET group are younger compared with patients in the ACLR only group (24 vs 30; $P<0.05$). No significant difference in the other demographic features between the two groups (Table-1).

Table-1: Patient data in each group

	ACLR only (n = 19)	ACLR with LET (n = 46)	P value
Gender Male Female	 10 9	 33 13	0.14
Age (yrs) (mean±SD)	30±10.2	24±5.7	**0.004**
Weight (Kg) (mean±SD)	73.4±17.4	71.6±12.5	0.64
Height (cm)	167.1±7.0	171.5±8.9	0.06
Side Right Left	 9 10	 20 26	0.77
Meniscus repair	13 (68%)	36 (78%)	0.402
Number of physiotherapy sessions at six months (mean±SD)	9±2.9	9.2±3.6	0.82
Duration of physiotherapy at six months (mean±SD)	5.5±1.2	5.6±1.3	0.91
Number of physiotherapy sessions at one year (mean±SD)	11.6±3.37	13.54±5.46	0.16
Duration of physiotherapy at one year (mean±SD)	10.16±2.75	10.17±3.04	0.98

Abbreviations: SD; standard deviation, ACLR; Anterior Cruciate Ligament reconstruction, LET; Lateral Extraarticular Tenodesis

Results

At six months, the patients ACLR with LET (Group 2) had better knee extensor and flexor strength. ($P<0.05$ except for 60 deg/s knee extensor). At one year, the patients ACLR with LET (Group 2) also had better knee extensor and flexor strength ($P<0.05$). The knee extension deficit recovery was poorer that knee flexion deficit recovery at both six months and one year ($P<0.05$). (Table-2)

Table-2: Mean peak torque (Nm) of operated knee at 6 months and 12 months after surgery

	6 months			One year		
	ACLR only (mean±SD)	ACLR with LET (mean±SD)	P value	ACLR only (mean±SD)	ACLR with LET (mean±SD)	P value
60 deg/s Extension	118±59	141±57	0.153	148±67	203±65	**0.003**
60 deg/s Flexion	70±28	98±31	**0.002**	96±30	121±28	**0.002**
180 deg/s Extension	89±39	115±42	**0.023**	121±52	160±42	**0.003**
180 deg/s Flexion	55±20	78±28	**0.002**	74±24	99±23	**0.001**
300 deg/s Extension	69±35	89±35	**0.034**	93±39	121±33	**0.003**
300 deg/s Flexion	43±16	60±25	**0.008**	58±17	76±18	**0.001**

Abbreviations: SD; standard deviation, ACLR; Anterior Cruciate Ligament reconstruction, LET; Lateral Extraarticular Tenodesis

Results

Having a concomitant meniscus repair did not influence muscle strength in both groups at six months and one year (P>0.05). (Table-3)

Table-3: Mean peak torque (Nm) for ACLR with LET (with and without meniscus repair) at 6 months and 12 months after surgery

	6 months			One year		
	Without meniscus repair (mean ± SD) N=10	With meniscus repair (mean ± SD) N=36	P value	Without meniscus repair (mean ± SD) N=10	With meniscus repair (mean ± SD) N=36	P value
60 deg/s Extension	141±64	140±55	0.95	207±78	202±62	0.841
60 deg/s Flexion	102±26	96±32	0.57	121±29	121±28	0.961
180 deg/s Extension	102±42	119±41	0.27	155±52	161±40	0.694
180 deg/s Flexion	80±25	77±30	0.78	99±23	99±23	0.973
300 deg/s Extension	74±33	94±35	0.1	115±36	123±32	0.497
300 deg/s Flexion	59±26	60±24	0.89	78±18	75±19	0.736

Abbreviations: SD; standard deviation

Conclusion

Adding an LET to ACLR does not worsen quadriceps and hamstring recovery at six months and one year after ACLR. Conversely, we see that the addition of the LET gives the confidence to help our patients regain strength at a faster rate.

References

1.Getgood A et al. No Difference in Functional Outcomes When Lateral Extra-Articular Tenodesis Is Added to Anterior Cruciate Ligament Reconstruction in Young Active Patients: The Stability Study. Arthroscopy 2020 Jun;36(6):1690–701.

2.Lee JH et al. Addition of anterolateral ligament reconstruction to primary anterior cruciate ligament reconstruction could benefit recovery of functional outcomes. Sci Rep. 2024 May 20;14(1):11440.

3.Gillet B et al. Isokinetic Strength After ACL Reconstruction: Influence of Concomitant Anterolateral Ligament Reconstruction. Sports Health. 2022;14(2):176–82.

4.Mesnard G et al. Does meniscal repair impact muscle strength following ACL reconstruction? SICOT-J. 2022;8:16.

5.Lepley LK at al. Does concomitant meniscectomy or meniscal repair affect the recovery of quadriceps function post-ACL reconstruction? KSSTA 2015 Sep;23(9):2756–61.