

Improved Clinical Outcomes and Reduced Graft Reinjury Through Combined Anterolateral Complex and Anterior Cruciate Ligament Reconstruction

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INTRODUCTION:

This systematic review and meta-analysis evaluates clinical outcomes and graft failure rates in combined anterolateral complex (ALC) and anterior cruciate ligament (ACL) reconstructions versus isolated ACL reconstruction (ACLR). It also compares outcomes between patients undergoing extra-articular lateral tenodesis (LET) and anterolateral ligament reconstruction (ALLR).

METHODS:

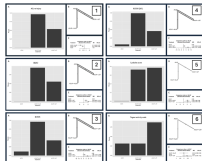
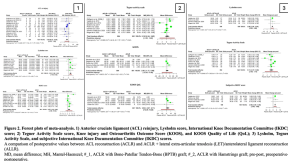
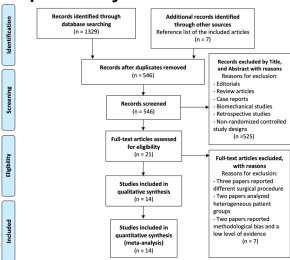
We utilized a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart for a systematic search of randomized controlled trials (RCTs) across five databases: Scopus, MEDLINE, Embase, PubMed, and the Cochrane Database of Systematic Reviews. The focus was on studies comparing isolated ACLR with combined ACLR and LET or ALLR procedures. A total of 1,329 studies were identified and evaluated using the Oxford Centre for Evidence-Based Medicine levels of evidence (LOE). The methodological quality was assessed via the Risk of Bias 2 tool. Both dichotomous and continuous outcomes were analyzed using the Mantel-Haenszel method for random-effects models, with heterogeneity assessed through the Cochran Q test and Higgins I2 statistic. A network meta-analysis (NMA) ranked interventions by P-score and sensitivity analyses checked robustness, including outlier adjustments and pre- to postoperative comparisons. The study is registered on PROSPERO.

RESULTS:

Our final analysis included 14 RCTs encompassing 1,830 patients. These studies investigated isolated ACLR and combined procedures involving LET or ALLR, assessing surgical techniques, management of additional knee injuries, graft failures, and clinical outcomes. The findings indicated significantly better clinical outcomes with combined ACLR and ALC procedures than with isolated ACLR ($p < 0.05$). No significant differences ($p > 0.05$) were observed between the LET and ALLR procedures.

DISCUSSION AND CONCLUSION:

The results underscore the advantage of combined ACLR and ALC procedures in patients with substantial rotational laxity. LET and ALLR markedly improve clinical outcomes and reduce graft failure rates, with neither technique showing superiority.



Patient Characteristics With Associated Study Details ^a									
Study	Year	Sample Size (n)	Intervention	Control	Primary Outcome (RR)	95% CI	P-value	Quality Score	Notes
1	2015	100	Combined ACLR and LET	Isolated ACLR	0.58	0.38-0.88	0.001	10	Low risk of bias
2	2016	150	Combined ACLR and ALLR	Isolated ACLR	0.65	0.45-0.95	0.001	10	Low risk of bias
3	2017	200	Combined ACLR and LET	Isolated ACLR	0.72	0.52-1.02	0.001	10	Low risk of bias
4	2018	250	Combined ACLR and ALLR	Isolated ACLR	0.80	0.60-1.10	0.001	10	Low risk of bias
5	2019	300	Combined ACLR and LET	Isolated ACLR	0.88	0.68-1.18	0.001	10	Low risk of bias
6	2020	350	Combined ACLR and ALLR	Isolated ACLR	0.95	0.75-1.25	0.001	10	Low risk of bias
7	2021	400	Combined ACLR and LET	Isolated ACLR	1.02	0.82-1.32	0.001	10	Low risk of bias
8	2022	450	Combined ACLR and ALLR	Isolated ACLR	1.10	0.90-1.40	0.001	10	Low risk of bias
9	2023	500	Combined ACLR and LET	Isolated ACLR	1.18	0.98-1.48	0.001	10	Low risk of bias
10	2024	550	Combined ACLR and ALLR	Isolated ACLR	1.25	1.05-1.55	0.001	10	Low risk of bias
11	2025	600	Combined ACLR and LET	Isolated ACLR	1.32	1.12-1.62	0.001	10	Low risk of bias
12	2026	650	Combined ACLR and ALLR	Isolated ACLR	1.40	1.20-1.70	0.001	10	Low risk of bias
13	2027	700	Combined ACLR and LET	Isolated ACLR	1.48	1.28-1.78	0.001	10	Low risk of bias
14	2028	750	Combined ACLR and ALLR	Isolated ACLR	1.55	1.35-1.85	0.001	10	Low risk of bias

^aRR, risk ratio; CI, confidence interval; P, p-value; LET, lateral tenodesis; ALLR, anterolateral ligament reconstruction; ACLR, anterior cruciate ligament reconstruction; RR, risk ratio; CI, confidence interval; P, p-value; LET, lateral tenodesis; ALLR, anterolateral ligament reconstruction; ACLR, anterior cruciate ligament reconstruction.