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# The Cost-Effectiveness of Lateral Extra-Articular Tenodesis in Primary Anterior Cruciate Ligament Reconstruction

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- Our disclosure(s) are:
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- AAOS: Board or committee member
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  Anika: Paid consultant
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- S.M.S. has received consulting fees from Smith & Nephew, Miach, Vericel,and Flexion Therapeutics; research support from Miach and Vericel; and honoraria from JRF; she also holds stock or stock options in Engage and Stryker.
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  BICMD: Stock or stock Options
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  Gramercy Extremity Orthopedics: Stock or stock Options
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  Pristine Surgical: Stock or stock Options
  RecoverX: Stock or stock Options

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Investigation performed at Hospital for Special Surgery, New York, NY.

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## Introduction

- ***Problem:*** Recent data have demonstrated favorable outcomes following anterior cruciate ligament reconstruction (ACLR) with lateral extra-articular tenodesis (LET) augmentation. However, the cost-effectiveness of this procedure compared to ACLR alone is unclear.
- ***Goal:*** Evaluate the cost-effectiveness of ACLR with LET augmentation compared to treatment with ACLR alone.

## Methods

- ***Design***: A Markov chain Monte Carlo probabilistic model was developed to evaluate the outcomes and costs of 1,000 athletes undergoing ACLR+LET (iliotibial band) compared to ACLR alone.
- ***Groups***: ACLR alone vs. ACLR + LET
- ***Outcome***: Costs, quality-adjusted life-years (QALYs), and the incremental cost-effectiveness ratio (ICER)
- ***Statistics***: Costs, utility values, graft failure rates, and transition probabilities were derived from existing literature. Targeted meta-analysis of failure rates and patient reported outcomes in randomized controlled trials of ACLR vs. ACLR+LET was performed. Sensitivity analyses assessed the cost-effectiveness of ACLR+LET across a range of clinical scenarios.

## Discussion / Conclusions

- LET augmentation is a cost-effective treatment option for athletic patients undergoing primary ACLR.
- ACLR+LET yielded both superior outcomes and lower overall costs than ACLR alone.
- In sensitivity analysis, only small improvements in graft failure rates were required for LET augmentation to be the favored treatment, suggesting that LET may be a cost-effective treatment option when used even beyond the highest risk athletes.

## Results

- ACLR+LET yielded a significantly lower graft failure rate (5%, 95% CI: 3%-9%) than ACLR alone (11%, 95% CI: 7%-18%) (Figure 1).
  - Relative risk 0.39, 95% CI: 0.27-0.57, p<0.001
- Across a five-year horizon, the mean total cost of ACLR alone was $68,605 ± $9,472 compared to $56,217 ± $7,349 for ACLR+LET.
- ACLR+LET was associated with an additional 1.88 ± 0.30 QALYs compared to 1.54 ± 0.30 QALYs for ACLR alone, and ACLR+LET was the preferred treatment in 98.1% of patients in the microsimulation model (Figure 2).
- In sensitivity analyses varying the failure rates of ACLR+LET or ACLR alone, ACLR+LET remained the most cost-effective treatment strategy when increasing the ACLR+LET failure rate up to a failure rate of 11.3% (Figure 3) or decreasing the ACLR alone failure rate down to a failure rate of 4.8% (Figure 4).

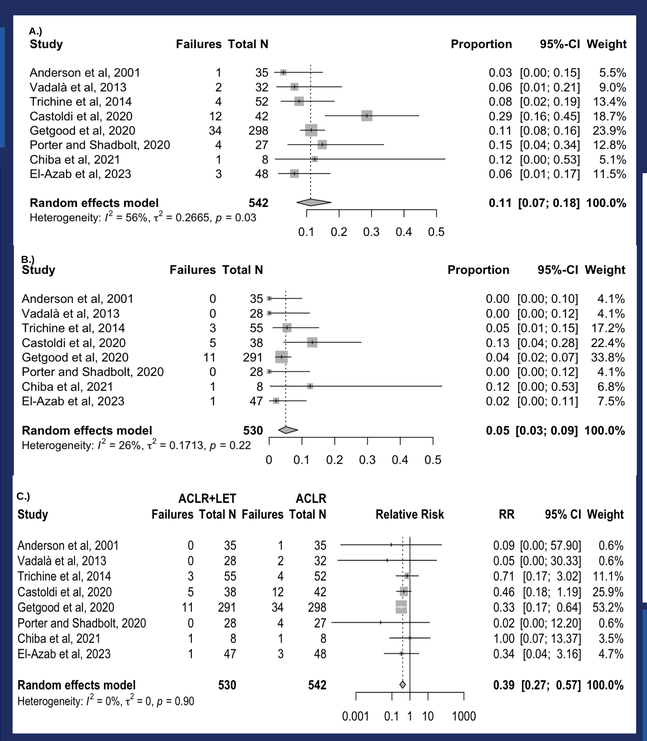


**Figure 1.** Random effects meta-analysis of randomized controlled trials with 95% confidence intervals (CI) demonstrating A.) weighted graft failure rates for anterior cruciate ligament reconstruction (ACLR) alone and B.) ACLR + lateral extra-articular tenodesis (LET). C.) Relative risk (RR) of graft failure between ACLR+LET versus ACLR alone.

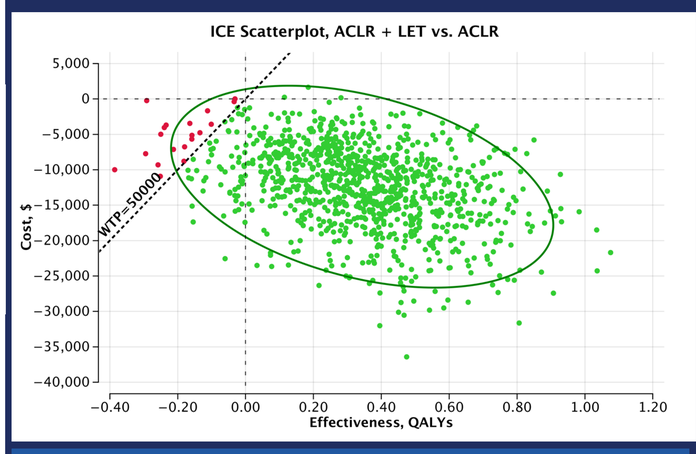


**Figure 2.** Incremental cost-effectiveness (ICE) scatterplot from the Monte Carlo simulation. At a willingness-to-pay threshold of $50,000, points (in green) to the right of the dashed willingness-to-pay (WTP) line represent the patients for whom anterior cruciate ligament reconstruction (ACLR) with lateral extra-articular tenodesis (LET) augmentation was the most cost-effective treatment strategy, while patients to the left of the dashed line (in red) represent the patients for whom ALCR alone would have been the most cost-effective strategy. The model's 95% confidence interval is represented by the ellipse.

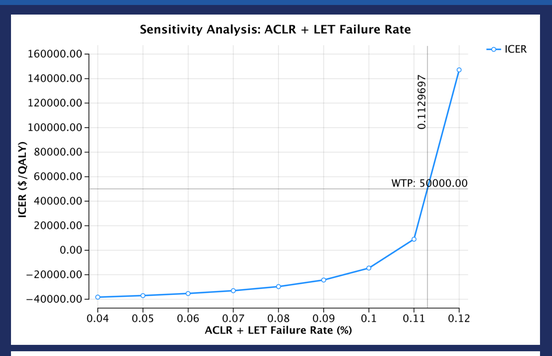


**Figure 3.** ICER of ACLR+LET compared to ACLR alone as a function of varying ACLR+LET graft failure rates, while holding the literature-observed ACLR alone failure rate constant (i.e., 11.0%). ACLR+LET would no longer be cost-effective at a failure rate of 11.3%. The ACLR+LET failure rate remaining cost-effective even slightly above the ACLR alone failure rate (11.0%) owes to the improved knee function-related quality of life observed with ACLR+LET in the literature.

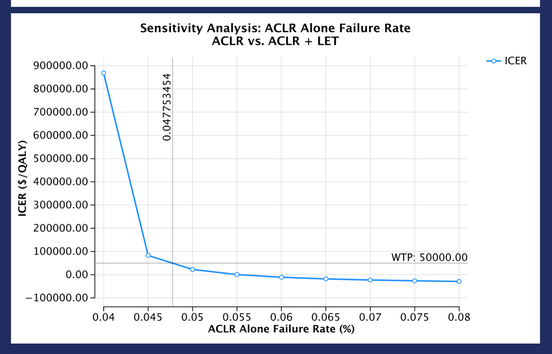


**Figure 4.** ICER of ACLR+LET compared to ACLR alone as a function of varying ACLR alone graft failure rates, while holding the literature-observed ACLR+LET failure rate constant (i.e., 5.0%). ACLR+LET would no longer be considered cost-effective at an ACLR alone failure rate of 4.8%. The ACLR alone failure rate being even slightly below the ACLR+LET failure rate (5.0%) to become cost-effective owes to the improved knee function-related quality of life observed with ACLR+LET in the literature.

# References


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