



Primary ACL Reconstruction: Bone-Patellar Tendon-Bone Graft with Modified Lemaire Tenodesis **Vs** Hamstring Graft with Anterolateral Ligament Reconstruction – A Clinical Comparative Matched-Pair Analysis From the Santi Study Group

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February 1-5, 2026





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- The SANTI Group

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Background & Rational

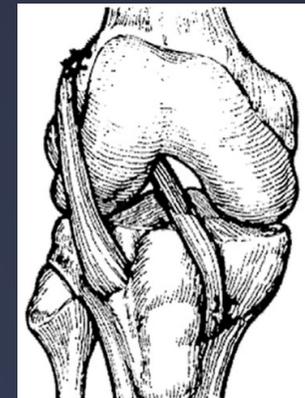
Residual rotational instability is considered as a major determinant of failure following ACL reconstruction

Two dominant combined strategies to fix this issue

- BPTB ACLR + Modified Lemaire LET
- Hamstring ACLR + ALL reconstruction

Current limitations

- Lack of direct head-to-head comparative studies between these 2 techniques
- Concern about lateral compartment overconstraint with LET



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Study Aim

Primary Objective

To compare **reoperation rates** between:
BPTB ACLR + Modified Lemaire Tenodesis **Vs** *Hamstring ACLR + ALL reconstruction*

Hypothesis

Anatomical ACLR using Hamstrings + ALL reconstruction provides:
Similar Re-Rupture and Reoperation Rates compared with BTB + Modified Lemaire



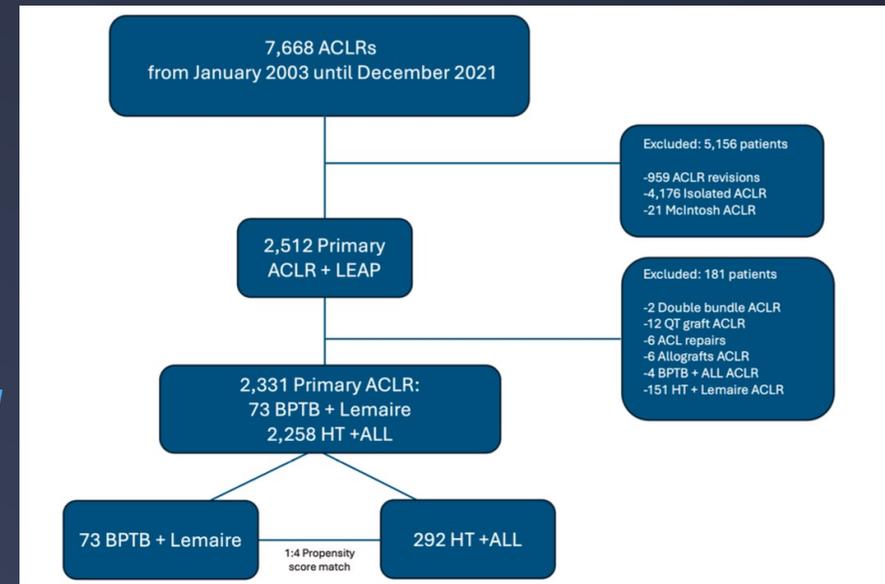
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Methods

- Retrospective, non-randomized, match-paired comparative study
- SANTI Study Group Database
- Between January 2003 and December 2021
- Propensity score matching was performed with a 1:4 ratio
Age, sex, interval from injury to surgery, presence of meniscal injury and participation in pivoting sports
- Follow-up
Minimum follow-up 2 years
Mean follow-up 2 to 5 years



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Study Cohort And Group

Overall Cohort

Total patients: n = 365

BPTB + LET: n = 73 Vs HT + ALLR: n = 292

Mean age: 24.9 ± 5.5 years

Male patients: 87.4%

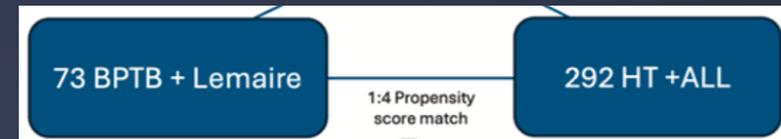
Pivot/contact sports: 89.6%

Mean follow-up: Overall: 91.8 ± 56.0 months

BPTB + LET: 162.6 ± 70.4 months

HT + ALLR: 74.1 ± 33.5 months

Same baseline characteristics and equivalent postoperative stability



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Key Clinical Outcomes

- Similar Graft Rupture Rates

BPTB + LET: 5.5% Vs HT + ALLR: 3.4%

- Equivalent postoperative stability

→ Side-to-side laxity: ~0.2 mm in both groups

- Significant Lower Reoperation Rate with HT + ALL

BPTB + LET: 24.7% Vs HT + ALLR: 10.6%

$p < 0.0001$

- Main Drivers of Reoperation

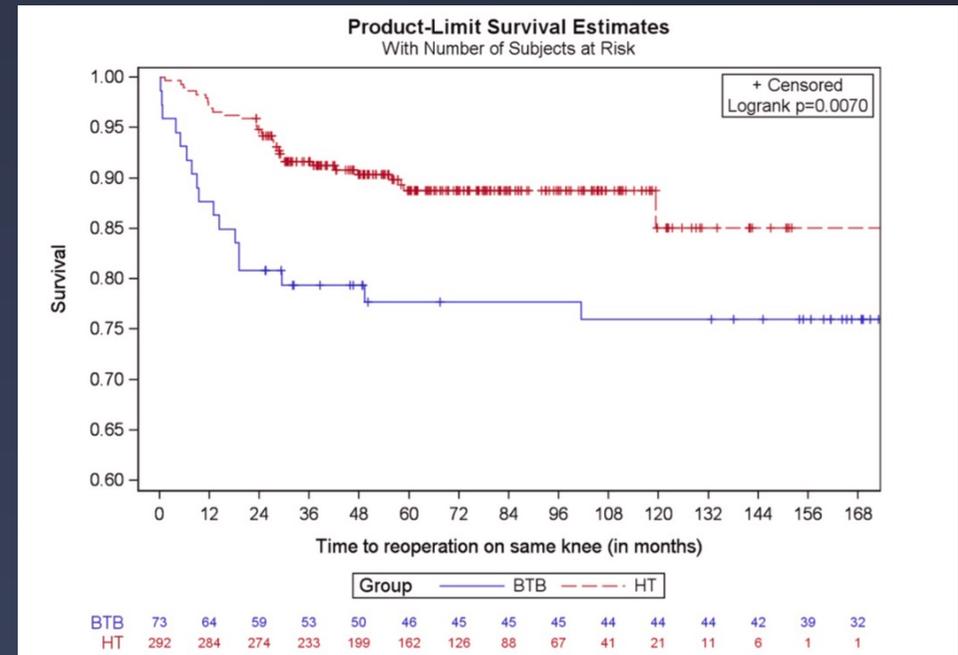
Secondary meniscal surgery: 12.3% (BPTB+LET) Vs 4.5% (HT+ALLR)

Infection: 4.1% vs 0.7%

- Multivariate Cox analysis:

BPTB + LET independently associated with reoperation risk

HR = 2.57 (95% CI 1.15–5.74), $p = 0.02$



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Potential Explanation

- Lower surgical invasiveness of HT + ALLR

- Smaller incisions
- Percutaneous lateral procedure
- Less risk of Hematoma and post-operative pain

- Shorter operative time

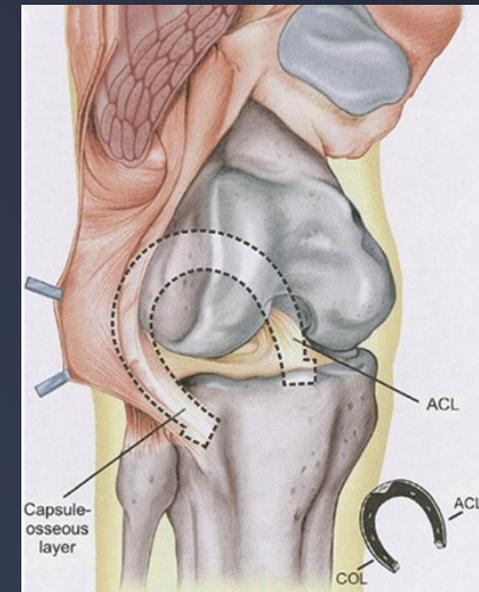
- -21 minutes on average with HT + ALLR
- Lower infection and complication exposure

- More physiological rotational control with anatomical ALL reconstruction

- Reduced lateral over-constraint risk
- Horseshoe Effect of combined graft

- Lower secondary meniscal surgery rate

- Suggests better long-term joint protection profile



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Study Limitations

Study Design

*Retrospective and non-randomized design
Potential selection bias*

Technique Heterogeneity

*Two ACL grafts (HT vs BPTB) Two lateral procedures (ALLR vs LET)
→ Limits ability to isolate the effect of a single variable*

Follow-up Differences

Longer follow-up in BPTB + LET group

Outcome Measures

*No PROMs (IKDC, Lysholm)
No return-to-sport data
No instrumented rotational laxity measurement*

But

- Propensity matching
- Cox model adjusting follow-up time
- Comparable postoperative laxity
- Same graft rupture rates

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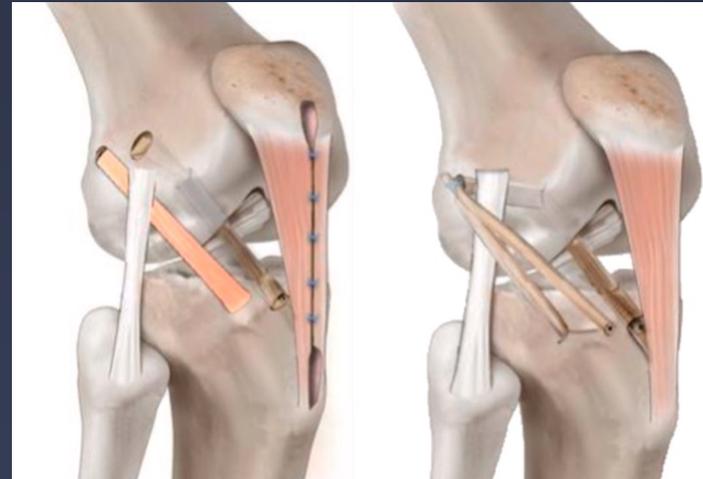


Take Home Message

There were **no significant differences** in graft rupture rates between the 2 groups.

Primary ACL reconstruction using **HT +ALLR** was associated with significantly **lower reoperation rates** compared to **BPTB + LET**.

BPTB +LET group had significantly increased reoperation rate due to **secondary meniscal procedures and infections**.



The truth often lies, unclaimed, in the middle.

Taylor Jenkins Reid

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