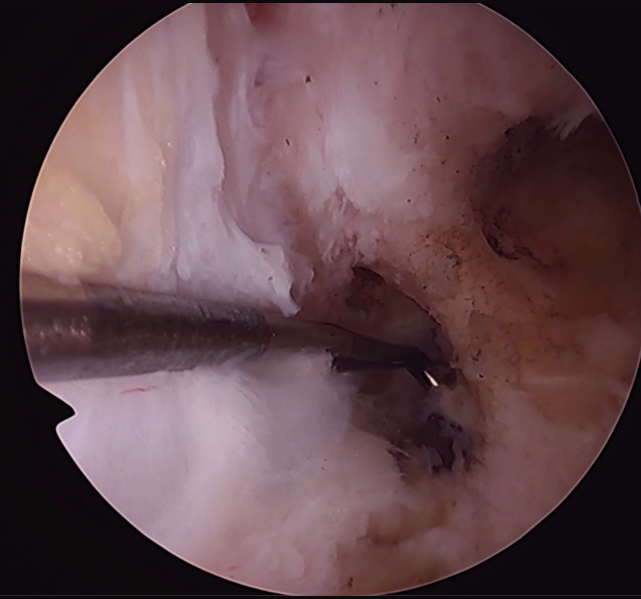


**Outcomes of *Repeat-Revision ACL Reconstruction***  
**Versus**  
***Non-Operative Treatment***



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***Study conducted at Santy Clinic, FIFA Center of Medical Excellence, Lyon, France***

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**I (and/or my co-authors) have something to disclose.**

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- The optimum management strategy after failure of revision anterior cruciate ligament reconstruction (RACLR) is not clearly defined.
- The literature evaluating differences in outcomes between surgical and nonsurgical management is sparse.

- The purpose was to evaluate the outcomes of surgical versus nonsurgical management of failed first RACLR.
- It was hypothesized that the long-term clinical outcomes of second RACLR would be superior with respect to knee stability, return to sport, and patient-reported outcome measures when compared with nonsurgical treatment.

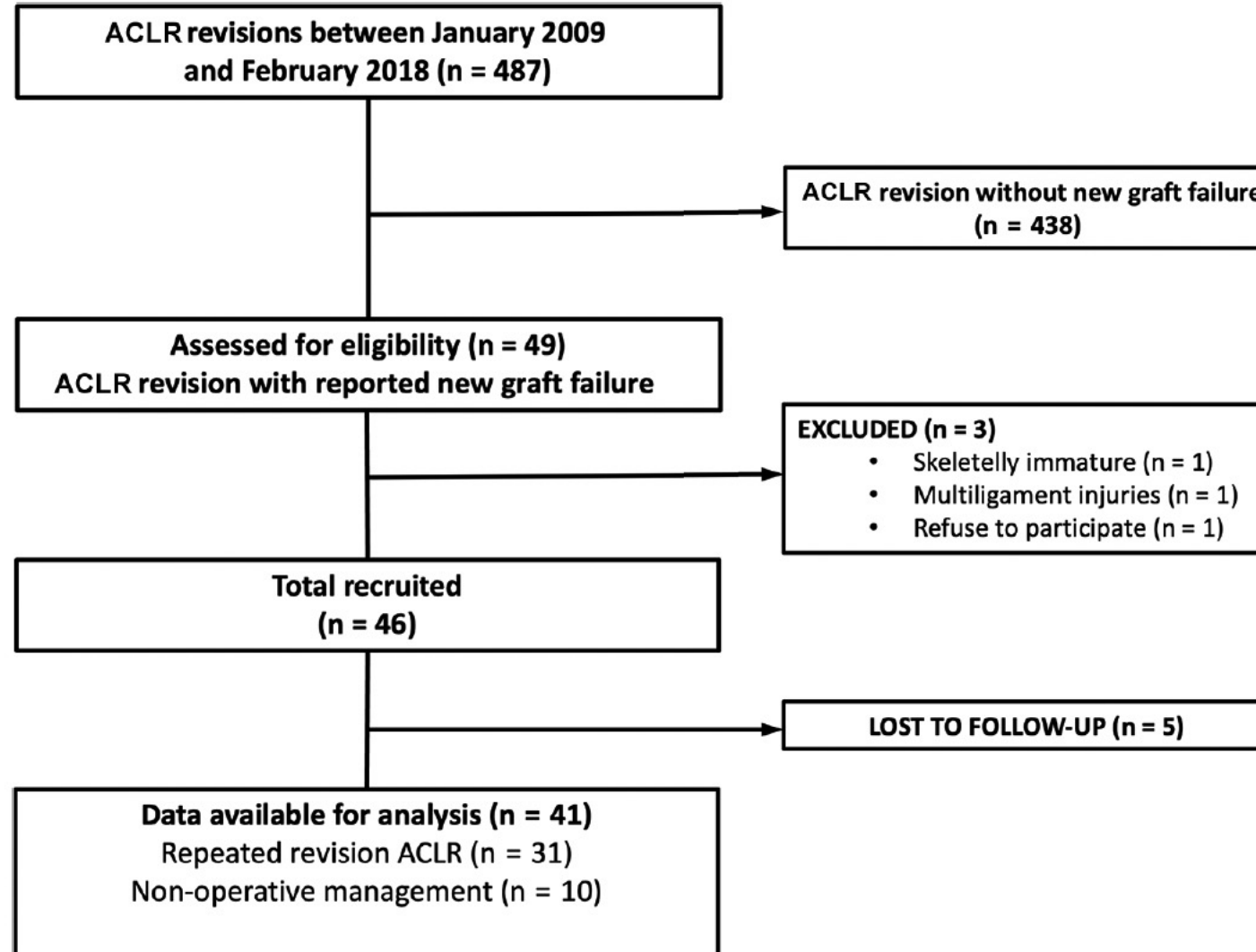
# Patient Selection

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- All patients who underwent RACLR, by the senior author (B.S.C.), between Jan 2009 and Feb 2018 were considered for study eligibility.
- Those who experienced failure of a first RACLR procedure were enrolled in the study
- Patients were considered to have sustained graft failure if they had confirmatory MRI and physical examination findings
- All patients with failure of a first RACLR procedure were included in the study.

- All participants followed the same rehabilitation protocol regardless of whether they underwent nonsurgical treatment of failed first RACLR or a second RACLR
- Follow-up comprised regular clinical review and a standardized telephone interview at the end of the study period. Patient-reported outcome measures were recorded at the final follow-up.

# Study Flow Diagram





# Population Characteristics

	Overall Population, n = 41	Patients Undergoing Second RACLR, n = 31	Patients Undergoing Nonsurgical Management, n = 10
Age at first RACLR failure, y	27 ± 7.05	26.1 ± 6	30.2 ± 9.1
Sex			
Male	31 (75.6)	21 (67.7)	10 (100)
Female	10 (24.4)	10 (32.3)	0
BMI	23.9 ± 3.1	23.4 ± 2.6	25.3 ± 4.2
Time from primary ACLR graft rupture to first RACLR surgery, mo	5.5 ± 9.9	5.4 ± 10.9	5.8 ± 6.4
Preinjury Tegner score	7.9 ± 1.53	7.6 ± 1.8	8 ± 1.43
Cause of rupture			
Pivoting sport	8 (19.5)	7 (22.6)	1 (10.0)
Pivoting and contact sport	27 (65.9)	21 (67.7)	6 (60.0)
Other (no sport)	6 (14.6)	3 (9.7)	3 (30.0)



# Clinical Outcomes

	Second RACLR, n = 31	Nonsurgical Treatment, n = 10	P Value
Side-to-side AP laxity difference	1.4 ± 1.8 (0-2)	5.3 ± 2 (5-6)	<.001
Sport activity participation			
Yes	30 (96.8)	10 (100)	
No	1 (3.2)	0	
Changed sport to lower intensity	17 (54.8)	7 (70.0)	.41
Return to preinjury level	13 (41.9)	3 (30.0)	.51
Tegner score	6.35 ± 2.2 (3-9)	4.8 ± 1.31 (3-7)	.012
ACL-RSI	61.9 ± 22.5 (23-100)	45.9 ± 24.6 (23-100)	.0635
IKDC subjective score	83.6 ± 11.7 (55-98)	82.1 ± 11.2 (68-100)	.6509
Proportion of patients achieving PASS for IKDC score	19 (61.3)	6 (60.0)	.096
IKDC grading			
Excellent/good	19 (61.3)	4 (40.0)	.6560
Fair/poor	12 (38.7)	6 (60.0)	.3034
KOOS			
Symptoms	89.9 ± 11 (57-100)	90.4 ± 7.0 (79-100)	.6325
Pain	93.7 ± 8.2 (75-100)	91.7 ± 5.8 (86-100)	.2254
Activities of Daily Living	98.7 ± 2.2 (92-100)	99.6 ± 0.9 (97-100)	.3643
Sport and Recreation	81.4 ± 15.3 (35-100)	62.5 ± 20.3 (30-100)	.0033
Quality of Life	72.6 ± 21 (13-100)	56.3 ± 25.5 (6-100)	.0490
Proportion of patients achieving PASS for KOOS			
Symptoms	31 (100)	10 (100)	
Pain	25 (80.6)	8 (80.0)	.79
Activities of Daily Living	21 (67.7)	8 (80.0)	.52
Sport and Recreation	23 (74.2)	3 (30.0)	.015
Quality of Life	22 (71.0)	5 (50.0)	.21
Lysholm score	88.5 ± 13.1 (44-100)	78.3 ± 12.9 (64-100)	.0353
Lysholm grading			
Excellent/good	26 (83.9)	3 (30.0)	.0067
Fair/poor	5 (16.1)	7 (70.0)	.0046
Marx activity scale	11.5 ± 4.3 (3-16)	8.5 ± 4.9 (0-14)	.0932

## Prognostic Factors Associated With Poor Outcomes According to the IKDC Subjective Score and Lysholm Score<sup>a</sup>

	Multivariate Analysis IKDC Subjective Score, n = 40			Multivariate Analysis Lysholm Score, n = 40		
	OR	95% CI	P Value	OR	95% CI	P Value
Age at first RACLR: <25 vs ≥25 y			.3116			.2161
BMI: ≥25 vs <25			.4444			.2392
Chondral lesions at second RACLR: 3-4 vs 0-2 lesions			.5996			.9716
LEAP at second RACLR: no vs yes			.6009			.5248
Nonsurgical treatment: yes vs no			.2986	14.908	2.313-160.695	<b>.0095</b>

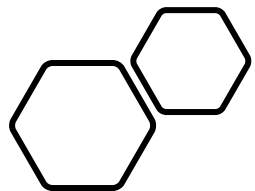
<sup>a</sup>Bold *P* value is statistically significant. Blank cells indicate non statistically significant variable. BMI, body mass index; IKDC, International Knee Documentation Committee; LEAP, lateral extra-articular procedures; OR, odds ratio; RACLR, revision anterior cruciate ligament reconstruction.

- Both 2nd RACLR and nonsurgical management of failed first RACLR were associated with very high rates of return to sport.
- However, there were significant differences between groups that strongly favored better overall function in the group treated with a second RACLR.

- 2nd RACLR associated with advantages over non-op with respect to:
  - Tegner, Lysholm, KOOS Quality of Life and Sport and Recreation
  - 74.2% of patients undergoing 2<sup>nd</sup> RACLR achieved PASS for KOOS Sport and Recreation compared with only 30% of those who underwent nonsurgical management ( $P = .015$ )
  - The proportion of patients achieving a good or excellent Lysholm score was significantly higher in the second RACLR group (83.9%vs 30%;  $P = .0067$ ).

- Small sample
- Retrospective design
- Asymptomatic re-ruptures may have been missed
- We were unable to account for patient preference (for either 2<sup>nd</sup> RACLR or non-op treatment) and the reasons behind those choices, which represent a potentially important confounder

- Both second RACLR and nonsurgical management of failed first RACLR were associated with high rates of return to sport.
- However, second RACLR was associated with significantly better functional outcome scores with respect to Tegner, Lysholm, KOOS Quality of Life, and KOOS Sport and Recreation scores compared to nonsurgical management.
- Nonsurgical treatment was the only significant predictor of failure to achieve a good/excellent Lysholm score at the final follow-up, and this was likely a function of inferior knee stability in that group.



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**Thank you.....**