

Comparison of long-term outcomes between surgical and conservative management for Anterior Cruciate Ligament Injury: A systematic review

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Background:

The anterior cruciate ligament (ACL) is essential for knee stability and function. ACL injuries are common, particularly in sports, and may lead to long-term complications such as knee osteoarthritis. Despite extensive research, the optimal treatment, surgical reconstruction or conservative management, remains unclear, especially regarding long-term outcomes.

Study Aim:

To compare the long-term outcomes (≥10 years) between surgical reconstruction versus conservative management in individuals with a full-thickness ACL rupture.

Methods:

Population: Patients of any age and sex, diagnosed with a full thickness ACL rupture

Intervention: Studies investigating primary ACL reconstruction (ACLR) using any graft type

Comparison: Conservative (non-surgical) management

Outcome: Studies reporting PROMs, ROA, re-injury rate, or secondary surgical procedures with a minimum of 10 years follow-up

Study design: Randomized Controlled Trials (RCT) and cohort studies

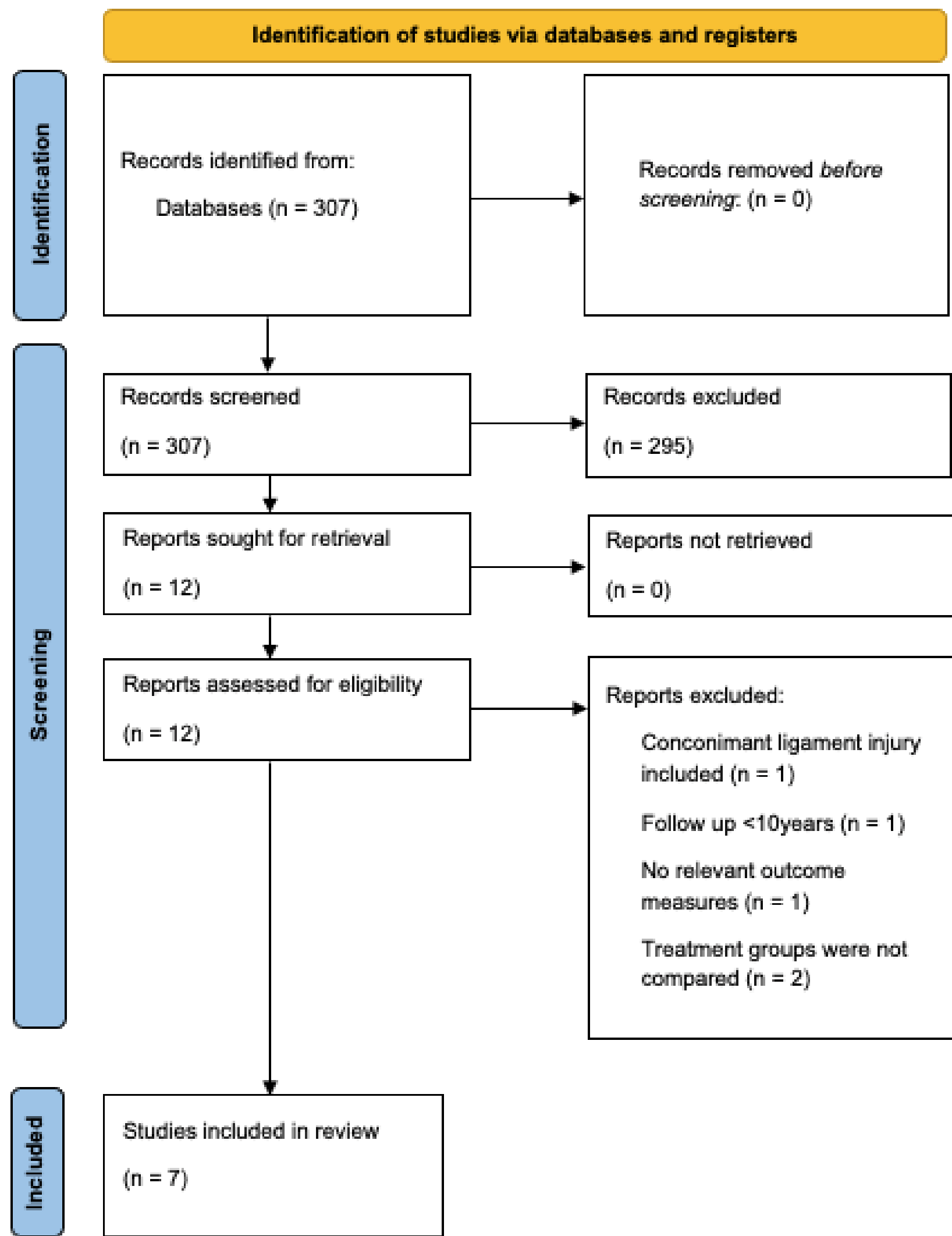


Fig. 1– PRISMA flow diagram for study selection

Results:

Outcome measure	Studies	Outcome measure tool	Study Design	Result S = Surgical, C = conservative	Mean follow up (years)	Sample	Mean age in years	F/M(%)
Patient Related Outcomes Measures (PROMs)	Filbay et al., 2025	KOOS4	RCT (secondary analysis)	ACLR associated with superior outcomes KOOS4: −15.5 [95% CI −26.4 to −4.7]	11	105	37(±5)	29/71
	Kvist et al., 2024	KOOS-QoL, ACL QoL, European QoL-5 and VAS	Cohort	No difference between treatment groups	20/35	59	21(±4)	31/69
	Tsoukas et al., 2016	IKDC	RCT	ACLR associated with superior outcomes S: 86.7(±6.5) C: 77.5(±13) (P = 0.04)	10.3	32	S: 31(20-36) C: 33(25-39)	0/100
	Urhausen et al., 2025	KOOS, IKDC, PASS	Cohort	No difference between treatment groups	10	191	27.4(±9.8)	48/52
	van Yperen et al., 2018	KOOS, IKDC	Cohort	No difference between treatment groups	20	50	S: 45.8(±6.4) C: 49.8(±6.8)	24/76
Radiographic Osteoarthritis (ROA)	Tsoukas et al., 2016	IKDC examination score	RCT	No difference between treatment groups	10.3	32	S: 31(20-36) C: 33(25-39)	0/100
	Urhausen et al., 2025	Kellgren and Lawrence classification	Cohort	No difference between treatment groups	10	191	27.4(±9.8)	48/52
	van Yperen et al., 2018	Kellgren and Lawrence classification	Cohort	No difference between treatment groups	20	50	S: 45.8(±6.4) C: 49.8(±6.8)	24/76
Secondary Injuries and Surgery	Hagmeijeret et al., 2019	Number of secondary meniscal tears	Cohort	ACLR treatment group less likely to have secondary meniscal tears S: 50 (7%) C: 63 (19%) (P = <0.01)	18	1,398	28.9(±9.6)	S: 34/66 C: 32.5/67
	Melbye et al., 2022	Number of secondary surgeries	Cohort	ACLR treatment group less likely to have a minor secondary surgery S: 865 (43.9%) C: 2,736 (49.1%) (P = 0.0001)	20-24 (range)	7,359	S: 25(95% CI 24.9–25.1) C: 25.5(95% CI 25.4–25.6)	36.7/63.3
	van Yperen et al., 2018	Number of secondary surgeries	Cohort	No difference between treatment groups.	20	50	S: 45.8(±6.4) C: 49.8(±6.8)	24/76

Fig. 2– Summary of Results

Conclusion:

At long term follow-up of at least ten years, it is inconclusive whether surgical or nonsurgical management of ACL ruptures confers superior PROMs, and ROA rates are similar. Surgical management appears to confer a protective effect against secondary meniscal surgeries.

Comparing treatment options remains a challenge in ACL injury research due to considerable selection and allocation bias, or confounding by indication in many studies. Further high-quality studies with long-term follow-up are required. Studies incorporating clinically relevant shared decision-making algorithms and focusing on the identification of predictors of successful outcomes for each treatment strategy would be of particular value to maximize patient outcomes.