

Effect of Isolated ACL Reconstruction on Rotational Stability in ACL-Injured Knees with Multiple Secondary Stabilizer Injuries

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INTRODUCTION:

Secondary stabilizers of the knee, such as ramp lesions, lateral meniscus posterior root tears (LMPRT), and anterolateral complex injuries (ALCI), are important contributors to rotational stability. The aim of this study was to investigate how ACL reconstruction (ACLR) affects instability in ACL-injured knees with multiple secondary stabilizer injuries.

METHODS:

Between January 2017 and March 2025, 408 patients underwent primary ACLR within one year of injury. Patients with additional ligament injuries, contralateral knee injuries, or meniscal injuries other than LMPRT and ramp lesions were excluded. Patients were grouped into a Single/Dual-injury group (SD; ≤ 1 secondary stabilizer injury) or a Multiple-injury group (M; ≥ 2 injuries). All LMPRT and ramp lesions were repaired. Instability was assessed under anesthesia by measuring anterior tibial translation (ATT), acceleration ratio, and external rotation angular velocity ratio during pivot-shift testing, both preoperatively and at the time of ACLR (after meniscal repair). Group comparisons were performed using the Mann-Whitney U test with a significance level of 0.05. The study was approved by the institutional ethics committee.

RESULTS:

A total of 180 patients met the inclusion criteria (SD, n=134; M, n=46). The cohort consisted of 79 males and 101 females, with a mean age of 23.5 ± 8.2 years and a mean BMI of 22.8 ± 3.1 kg/m². The proportion of preoperative IKDC grade 3 was higher in the M group (21.7% vs 7.5%, p=0.026). The M group also showed greater ATT (5.25 vs 4.00 mm, p=0.017) and acceleration ratio (3.50 vs 2.50, p=0.003) preoperatively. At the time of ACLR, the acceleration ratio remained higher in the M group (1.20 vs 1.10, p=0.045). The prevalence of ALCI was 35.8% in the SD group and 93.5% in the M group (p<0.001).

DISCUSSION:

Knees with multiple secondary stabilizer injuries showed more severe preoperative instability, particularly in rotational parameters, compared with knees with fewer associated injuries. Even after ACLR, residual instability persisted in the multiple-injury group, suggesting that reconstruction of the ACL alone may not provide sufficient stabilization. Because ramp and LMPRT lesions were repaired equally in both groups, these factors are unlikely to account for the persistent difference. Instead, the markedly higher prevalence of ALCI in the multiple-injury group appears to play a central role. This finding reinforces the growing recognition that the anterolateral complex is a key contributor to controlling rotational laxity. Surgeons should be aware that residual pivot-shift after ACLR may not simply reflect graft insufficiency but also unaddressed concomitant injuries, especially ALCI.

SIGNIFICANCE/CLINICAL RELEVANCE:

These findings highlight the importance of recognizing and managing secondary stabilizer injuries in ACL-injured knees. The high rate of ALCI in multiple-injury cases suggests that addressing it during surgery may be key to reducing residual pivot-shift and improving outcomes.

Image. Secondary stabilizers of the knee

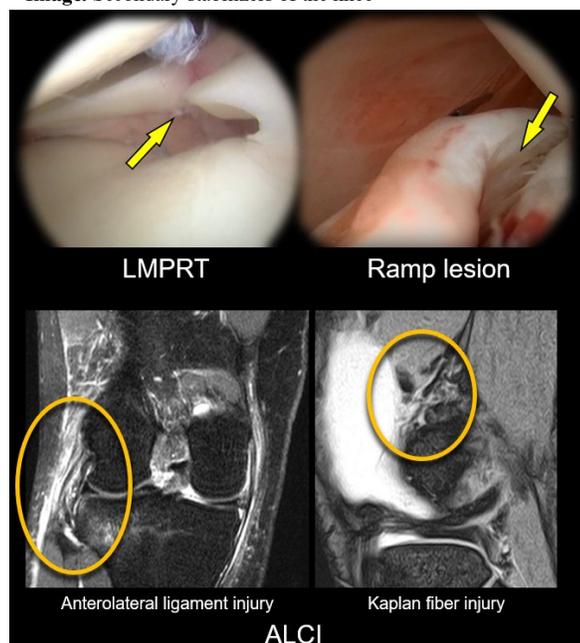


Table. Injury patterns of secondary stabiliser injuries

Group	Injury patterns	Patient no.(%)
Single/Dual injury (n = 134)	Isolated ACL injury	57 (31.7)
	ACL injury + ALCI	48 (26.7)
	ACL injury + Ramp lesion	22 (12.2)
	ACL injury + LMPRT	7 (3.9)
Multiple-injury (n = 46)	ACL injury + Ramp lesion + ALCI	29 (16.1)
	ACL injury + LMPRT + ALCI	5 (2.8)
	ACL injury + Ramp lesion + LMPRT	3 (1.7)
	ACL injury + Ramp lesion + LMPRT + ALCI	9 (5.0)

Abbreviations: ACL, anterior cruciate ligament; ALCI, anterolateral complex injury; LMPRT, lateral meniscus posterior root tear