

Rehabilitation Predictors of Clinical Outcome following Revision ACL Reconstruction

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Objectives: Revision ACL reconstruction has been documented to have worse outcomes compared with primary ACL reconstructions. The reasons why remain unknown. The purpose of this study was to determine whether rehabilitation-related factors prescribed at the time of ACL revision reconstruction significantly influence two year outcomes, as well as the incidence of incurring a subsequent re-operation. Our hypothesis was that immediate versus passive, active range of motion (ROM) and weightbearing will result in improved outcomes without incidence of subsequent surgery. Use of postoperative and functional return to sport braces will not improve return to sports function.

Methods: Revision ACL reconstruction patients were identified and prospectively enrolled between 2006 and 2011. Data collected included baseline demographics, surgical technique and pathology, prescribed post-op and rehabilitation instructions (ie. timing of weightbearing, timing of passive and active ROM, use of postoperative and return to sport braces) and a series of validated patient reported outcome instruments (IKDC, KOOS, and Marx activity rating score). Patients were followed up for 2 years, and asked to complete the identical set of outcome instruments. Because meniscal repair, meniscal transplants, HTOs, concurrent ligamentous reconstructions, and certain chondral treatments (ie. microfracture, abrasion arthroplasty, mosaicplasty, etc) are known to affect prescribed rehab treatments, patients with these pathologies were excluded from the analyses. Regression analysis was used to control for age, gender, activity level, baseline outcome scores, and the above-mentioned rehabilitation-related variables, in order to assess the risk factors for clinical outcomes 2 years after revision ACL reconstruction.

Results: A total of 843 patients met the inclusion criteria and were successfully enrolled. 482 (57%) were males, with a median cohort age of 27 years. Baseline characteristics of the cohort are summarized in Table 1. At 2 years, follow-up was obtained on 82% (694/843). There were two rehabilitation-related factors which were found to be influential of 2 year outcomes. Patients who were prescribed an ACL brace for return to sport had significantly better KOOS sports/rec scores at 2 years (odds ratio=1.50; 95% CI=1.07-2.11; p=0.019). Patients who were prescribed an ACL derotation brace to be used in post-op rehab were 2.26 times more likely to have a subsequent surgery by 2 years (OR = 2.26; 95% CI=1.11-4.60; p=0.024). Lower baseline outcome scores, activity level, and female gender all significantly increased the odds of reporting poorer clinical outcomes (IKDC, all KOOS subscales, and Marx activity rating score) at 2 years. Alternatively, whether or not a physician restricted a patient's passive or active ROM post-operatively, restricted full weight-bearing without support, or prescribed a motion control brace post-op, were all found not to be influential risk factors for 2 year outcomes in this revision cohort.

Conclusion: There are rehabilitation-related factors that the physician can control at the time of an ACL revision which have the ability to modify clinical outcomes at 2 years. The odds of having a higher KOOS sports/rec score increases by 50% in patients who wore a functional brace for sports (versus patients who didn't). However, patients who were prescribed a derotation brace used for post-op rehab were 2.3 times more likely to incur a subsequent surgery by 2 years.

Table 1. Baseline Cohort Characteristics	Percentage (n)	If yes, then median (25 th , 75 th quartile) time (in days)
Gender		
• Male	57% (482)	
• Female	43% (361)	
Passive range of motion (ROM) restriction:		
• No	89% (745)	
• Yes	11% (94)	14 (5, 28)
Active ROM restriction:		
• No	86% (722)	
• Yes	14% (115)	16 (7, 30)
Post-op full <u>weightbearing</u> (without support) restriction:		
• No	60% (507)	
• Yes	40% (332)	21 (14, 28)
Motion control brace (i.e. knee immobilizer) prescribed post-operatively:		
• No	45% (380)	
• Yes	55% (458)	24 (14, 42)
ACL <u>derotation</u> brace used in post-op rehab:		
• No	85% (715)	
• Yes	15% (124)	180 (90, 365)
ACL <u>derotation</u> brace used in return to sport:		
• No	69% (573)	
• Yes	31% (253)	365 (300, 365)

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