Double Bundle Posterior Cruciate Ligament Reconstruction in 100 Patients at a Mean 3 Years Follow up: Outcomes were Comparable to an Anterior Cruciate Ligament Reconstructions

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Objectives: 1) To report on the outcomes after double-bundle PCL reconstructions in isolated versus combined injuries and acute versus chronic PCL tears and 2) to compare the outcomes of isolated double-bundle PCL reconstruction (DB PCLR) to isolated ACL reconstruction (ACLR).

Methods: All patients who underwent a primary arthroscopic assisted DB PCLR for grade-III isolated or combined PCL injuries between May 2010 and March 2015 were reviewed. Patient reported outcome scores (Lysholm, Tegner, Western Ontario and McMaster Universities Arthritis Index (WOMAC), 12 item Short Form Health Survey (SF-12) Physical Component Summary (PCS) and patient satisfaction with outcome) and objective posterior stress radiographs were collected preoperatively and at a minimum of two years postoperatively. Cohort subanalyses comparing isolated versus combined, and acute versus chronic PCL reconstructions were also performed. Patients who underwent isolated ACLR over the same inclusion period were selected as a comparison group.

Results: One hundred patients that underwent DB PCLR were included in this study. There were 31 isolated PCL injuries and 69 combined PCL injuries and the mean follow-up was 2.9 years (range 2-6 years). The median Tegner activity score improved from 2 to 5, Lysholm from 48 to 86, WOMAC from 35.5 to 5, and SF-12 PCS from 34 to 54.8 (all p values <0.001). The mean side-to-side difference (SSD) in posterior tibial translation on kneeling stress radiographs improved from 11.0 mm preoperatively to 1.6 mm postoperatively (p<0.001). There were no significant differences in postoperative functional scores between isolated PCL reconstructions and combined PCL reconstructions (all p values >0.229). The mean SSD in postoperative posterior tibial translation on stress radiographs was 1.2 ± 1.1 mm for isolated PCL tears and 1.7 ± 2.2 mm for combined PCL tears. The improvement in posterior tibial translation from preoperative to postoperative was significant for both the isolated and combined PCL injury groups (p<0.001). Only the Tegner score (p<0.001) and patient satisfaction (p=0.011) were significantly different postoperatively between acute and chronic reconstructions, both favoring acutely treated PCL injuries. The mean SSD in posterior tibial translation on stress radiographs improved from 11.6 ± 3.1 mm preoperatively to 1.9 ± 2.5 mm postoperatively (p<0.001) for acute PCL tears, and 10.3 ± 3.7 mm to 1.2 ± 1.0 mm (p<0.001) for chronic PCL tears. There were no significant differences in postoperative outcome scores between patients that underwent an isolated ACLR or isolated DB PCLR [all p values >0.064].

Conclusion: Significantly improved functional and objective outcomes were observed after anatomic-based DB PCLR at a mean 3 years follow-up, regardless of concomitant ligamentous pathology or timing to surgery. Posterior tibial translation was restored to near normal after DB PCLR. Additionally, contrary to previous reports, similar results were achieved compared to a control isolated ACLR cohort.

Table 1: Patient demographics and preoperative outcome scores demonstrating that the initial status of both cohorts was comparable. Data presented as counts, mean • SD or median [1st quartile, 3rd quartile], unless otherwise noted. N/A=Not applicable; FET= Fisher's exact tests; (χ^2)= chi-squared tests; MWU=Mann-Whitney U-tests

Variable	PCL Reconstruction Cohort (n=100)	ACL Reconstruction Cohort (n=141)	P-Value
Patients	100	141	N/A
Age	Mean 31.7 (range, 14-66)	Mean 35.2 (range, 14-81)	0.042* (MWU)
Gender	Male: 77 Female: 23	Male: 63 Female: 78	<0.001* (FET)
Follow-Up Interval (years)	Mean 2.9 (range, 2-6)	Mean 3.1 (range, 2-7)	0.289 (MWU)
Chronicity	Acute: 52 Chronic: 48	Acute: 93 Chronic: 48	0.033 (FET)
Meniscus Tear Distribution	None: 54 Medial Meniscus: 23 Lateral Meniscus: 16 Medial & Lateral Meniscus: 7	None: 66 Medial Meniscus: 39 Lateral Meniscus: 21 Medial & Lateral: Meniscus: 15	0.590 (χ^2)
Outerbridge Grade IV Chondral lesions (Grade, Location)	Full thickness lesions: 11	None	N/A
Preoperative Outcome Scores	PCL Reconstruction Cohort (n=100)	ACL Reconstruction Cohort (n=141)	P-Value
Tegner Activity Scale	2 [1, 3]	2 [1, 5]	0.135 (MWU)
Lysholm Score	49.6 ± 25.1	51.0 ± 23.2	0.691 (t- test)
Western Ontario and McMaster Universities Arthritis Index Total	38.7 ± 27.9	35.2 ± 23.1	0.333 (t- test)
Short Form-12 Physical Health Composite Score	37.6 ± 10.9	40.3 ± 9.7	0.015* (t- test)

Fig 1. Difference in medians for functional outcome scales. Horizontal lines indicate 95% bootstrap confidence intervals.