

Prior Isolated Meniscus Surgery Significantly Increases the Risk for Future Ipsilateral Anterior Cruciate Ligament Reconstruction up to 5 Years: An Analysis of over 100,000 Patients

William McLaughlin, Stephen M Gillinov, Peter Y Joo¹, Jay Thomas Moran, Jonathan N Grauer, Elizabeth Gardner
¹Yale New Haven Health

INTRODUCTION:

Meniscus tears in a young population often occur from a traumatic, rotational mechanism of injury, which is similar to that of an ACL tear. However, there is limited evidence regarding the risk of subsequent ACL injury following a surgically treated isolated meniscus tears. The purpose of this study was to investigate the risk of subsequent ipsilateral ACL reconstruction (ACL-R) in patients who were surgically treated for isolated meniscus tears compared to the incidence of ACL-R in the general population. We hypothesized that a prior meniscus tear, more specifically a bucket-handle tear, is indicative of a more severe injury and thus increases the risk of subsequent ipsilateral ACL-R.

METHODS:

The PearlDiver Mariner 91 database was queried for patients aged 10-40 years who were surgically treated for isolated meniscus tears using CPT and ICD-10 codes between 2015 to 2020. Patients with any prior cruciate or ligamentous or meniscus injury of the knee or surgery, other concurrent arthroscopic procedure of the knee apart from meniscus repair or meniscectomy, and any concurrent fractures of the femur, tibia, fibula, or patella were excluded. The population incidence for first time ACL-R was determined in patients with the same 10–40-year age range and during the same 2015-2020 time period. Cohorts for meniscal tear pathology (including laterality) and surgical treatment (repair vs. meniscectomy) were formed. Ipsilateral subsequent re-operations for ACL-R were tracked up to 5 years. Multivariate logistic regression was performed to compare the risk of subsequent ipsilateral ACL-R after isolated meniscus tear treated surgically to the general population incidence of ACL-R.

RESULTS:

In total, 106,185 isolated meniscus tears that underwent repair or meniscectomy were identified (**Figure 1**). The population incidence for first time ACL-R was ≈ 0.2%. After controlling for demographics, comorbidities, and procedure type, patients that were surgically treated for an isolated BH tear (1.7%) were at significantly higher odds of ACL-R within 5 years compared to population incidence of ACL-R (OR 8.54, P<0.001) (**Table 1**). Medial BH tears (2.2%) had significantly increased odds of ACL-R up to 5 years (OR 10.87, P < 0.001). Non-BH tears (0.9%) had significant higher odds of ACL-R up to 5 years (OR 3.66, P<0.001). Medial BH tears that were repaired (4.0%) had the highest odds of ACL-R (17.53, P<0.001) up to 5 years relative to the general population.

DISCUSSION AND CONCLUSION:

The present study is the first to analyze the odds of ACL-R after suffering a prior meniscus tear treated surgically. We found that patients with surgically treated, isolated BH tears are significantly more likely to require ipsilateral ACL-R surgery compared to those treated for all other types of isolated meniscus injuries. Medial BH tears conferred the greatest odds of requiring subsequent ACL-R, suggesting that a BH meniscus tear, especially a medial sided BH tear, is a possible sign of underlying knee instability. Such findings suggest that for patients who undergo surgical treatment for isolated BH tears, ACL injury prevention should be incorporated into rehabilitation protocols.

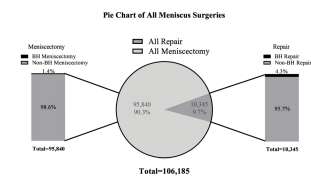


Figure 1: Comparison of BH meniscectomy vs. non-BH meniscectomy and BH repair vs. non-BH repair.

Table 1: Odds of ACL reconstruction after 5 years

Variable	Reference	OR	95% CI	P-Value
BH Tear	Population Incidence	8.54	1.58 - 47.01	<.001
Medial BH Tears	Population Incidence	10.87	1.20 - 98.41	<.001
Lateral BH Tears	Population Incidence	5.93	1.22 - 27.48	<.001
Non-BH Tears	Population Incidence	3.66	1.92 - 6.91	<.001
Medial BH Repair	Population Incidence	17.53	4.42 - 70.31	<.001
Lateral BH Repair	Population Incidence	7.66	4.45 - 12.68	<.001
Non-BH Repair	Population Incidence	3.21	2.80 - 3.70	<.001
Medial BH Meniscectomy	Population Incidence	13.38	3.65 - 47.71	<.001
Lateral BH Meniscectomy	Population Incidence	8.78	5.25 - 14.78	<.001
Non-BH Meniscectomy	Population Incidence	2.63	2.33 - 2.97	<.001

Abbreviations: ACL - Anterior Cruciate Ligament; BH - Bucket Handle Tear; CI - Confidence Interval; OR - Odds Ratio. Boldface indicates statistical significance (P<0.05). Controlling for age, sex, ECI, and BMI>35. Abbreviations: ACL - anterior cruciate ligament; BH = bucket handle tear; CI = confidence interval; OR = odds ratio.