

# The Meniscus Repair Healing Index

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## Background

- Compared to meniscectomy, repairing meniscus injuries has better mid- and long-term outcomes and decreased rates of early-onset knee osteoarthritis
- No scoring system exists that identifies a patient's likelihood of failure after meniscus repair
- **Purpose:** to develop a scoring index that predicts failure after meniscus repair based on patient characteristics to aid in clinical decision-making

## Methods

- 518 patients were reviewed that underwent meniscus repair between 2012-2024
- Patients with a minimum of 6 months follow-up, >18 years old at DOS, and did not have multiligament injuries
- Failure was defined as re-tear confirmed by MRI
- Variables were analyzed through univariate logistic regression to determine odds ratios
- In future analyses, odds ratios will be used to create a scoring system and applied retrospectively for validation

## Table 1. Inclusions/Exclusions

<b>Total Reviewed</b>	878
<b>Total Included</b>	518
<b>Total Excluded</b>	360
<b>Reasons for Exclusion</b>	
<i>Did not undergo repair</i>	5
<i>Multiligament injuries (&gt;2)</i>	90
<i>Age &lt;18 years at time of surgery</i>	3
<i>Lost to follow-up</i>	262

## Table 3. Results Summary

CHARACTERISTIC	OR	95% CI	p-value
Age (years)	0.999	0.978, 1.019	0.928
BMI	0.988	0.932, 1.041	0.666
Current Smoker	1.677	0.470, 4.730	0.391
Atraumatic Etiology	1.761	1.035, 2.965	0.037
Activity Level			0.718
<i>Moderate</i>	0.570	0.138, 3.847	
<i>High</i>	0.727	0.135, 5.590	
No. Previous Surgeries	1.161	0.775, 1.644	0.427
Meniscus Laterality			0.057
<i>Lateral</i>	0.678	0.277, 1.757	
<i>Medial</i>	1.465	0.713, 3.327	
Revision Repair	2.174	0.886, 4.830	0.087
Concomitant Procedures			0.344
<i>ACL procedures</i>	0.562	0.261, 1.317	
<i>Cartilage procedures</i>	0.289	0.015, 1.739	
<i>Debridement procedures</i>	0.915	0.388, 2.287	
<i>Meniscal healing procedures</i>	0	-	
<i>Other ligament procedures</i>	0	-	
<i>Other</i>	0.867	0.042, 6.315	

## Table 2. Clinical & Demographics Summary

	OVERALL	INTACT	RETEAR
	N = 518 (100%)	N = 450 (86.9%)	N = 68 (13.1%)
<b>Length of Follow-Up (months)</b>			
<i>Mean (SD)</i>	17.63 (10.69)	16.51 (10.08)	25.06 (11.66)
<i>Min, Max</i>	5.90, 58.46	5.90, 58.43	6.69, 58.46
<b>Age (years)</b>			
<i>Mean (SD)</i>	35.95 (12.53)	35.97 (12.71)	35.82 (11.35)
<i>Min, Max</i>	18.00, 76.00	18.00, 76.00	18.00, 68.00
<b>BMI</b>			
<i>Mean (SD)</i>	26.11 (4.78)	26.14 (4.80)	25.88 (4.69)
<i>Min, Max</i>	18.31, 50.45	18.31, 50.45	18.50, 41.90
<b>Smoking Status</b>			
<i>Current</i>	21 (4.1%)	17 (3.8%)	4 (5.9%)
<i>Former</i>	50 (9.7%)	41 (9.1%)	9 (13%)
<i>Never</i>	447 (86%)	392 (87%)	55 (81%)
<b>Etiology</b>			
<i>Atraumatic</i>	156 (30%)	128 (28%)	28 (41%)
<i>Traumatic</i>	362 (70%)	322 (72%)	40 (59%)
<b>Activity Level</b>			
<i>Low</i>	10 (1.9%)	8 (1.8%)	2 (2.9%)
<i>Moderate</i>	393 (75.9%)	344 (76.4%)	49 (72.1%)
<i>High</i>	39 (7.5%)	33 (7.3%)	6 (8.8%)
<i>Unknown</i>	76 (14.7%)	65 (14.4%)	11 (16.2%)
<b>No. Previous Surgeries</b>			
0	401 (77%)	354 (79%)	47 (69%)
1	85 (16%)	69 (15%)	16 (24%)
2	14 (2.7%)	11 (2.4%)	3 (4.4%)
3	7 (1.4%)	7 (1.6%)	0 (0%)
6	1 (0.2%)	1 (0.2%)	0 (0%)
<i>Unknown</i>	10 (1.9%)	8 (1.8%)	2 (2.9%)
<b>Meniscus Laterality</b>			
<i>Both</i>	78 (15.1%)	69 (15.3%)	9 (13.2%)
<i>Lateral</i>	146 (28.2%)	134 (29.8%)	12 (17.6%)
<i>Medial</i>	293 (56.6%)	246 (54.7%)	47 (69.1%)
<i>Unknown</i>	1 (0.2%)	1 (0.2%)	0 (0%)
<b>Revision Status</b>			
<i>Primary</i>	484 (93%)	424 (94%)	60 (88%)
<i>Revision</i>	34 (6.6%)	26 (5.8%)	8 (12%)
<b>Concomitant Procedures</b>			
<i>None</i>	48 (9.3%)	39 (8.7%)	9 (13%)
<i>ACL procedures</i>	331 (64%)	293 (65%)	38 (56%)
<i>Cartilage procedures</i>	16 (3.1%)	15 (3.3%)	1 (1.5%)
<i>Debridement procedures</i>	109 (21%)	90 (20%)	19 (28%)
<i>Meniscal healing procedures</i>	7 (1.4%)	7 (1.6%)	0 (0%)
<i>Other ligament procedures</i>	6 (1.2%)	5 (1.1%)	1 (1.5%)
<i>Other</i>	1 (0.2%)	1 (0.2%)	0 (0%)

## Conclusions

- Average follow-up was approximately 18 months
- Overall rate of re-tear was low (13.1%)
- Atraumatic causes of meniscus injury were 1.76 times more likely to fail
- All other risk factors studied had no significant impact on meniscus re-tear rate

## Limitations

- Single-center and small sample size
- Does not include subjective failures
- Limited variables analyzed
- Still need to develop scoring index

## Future Directions

- Increase sample size
- Assess patient reported outcomes to determine subjective failures
- Analyze additional variables
- Determine odds ratios of significant risk factors and assign scores, then apply retrospectively to a subset of patients to validate the scoring index

## Disclosures

- None