

Assessing the Trends and Risk Factors of Operative Versus Non-Operative Management of Achilles Tendon Ruptures: A National Database Cohort Study

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INTRODUCTION: Despite its robust structure, the Achilles tendon rupture (ATR) is one of the most common tendon injuries. The incidence of ATR has only increased over the last few decades. The current literature suggests that operative and non-operative treatment performs similarly with regards to short and long-term outcomes. Although previous studies have explored predictors of ATRs and have compared re-rupture rates between treatment options, there are no studies that examine the risk factors of operative versus non-operative ATR management. In this study, we aim to assess trends in operative management of ATR, as well as identify factors associated with operative treatment for ATR.

METHODS: This is a retrospective cohort study of patients with Achilles tendon ruptures from 2017 to 2022 using the Mariner PearlDiver database (PearlDiver Technologies, Colorado Springs, CO). This database contains deidentified data from over 160 million patient lives from multiple insurance payer types. Current Procedural Terminology (CPT) and International Classification of Diseases (ICD)-10 codes were used to identify patients who were treated operatively or non-operatively for Achilles tendon ruptures. Patients were then stratified based off the following demographic variables: sex, age, year of injury, insurance status, tobacco use, history of diabetes, evidence of obesity (BMI ≥30), and their assigned Charleston Comorbidity Index (CCI). Both univariate and multivariate analyses were conducted to assess for risk factors associated with operative management of ATR.

RESULTS:

A total of 162,536 patients with ATR were identified from the PearlDiver database between 2017-2022. Of these, 16.3% underwent operative treatment. Male patients were more likely to undergo operative treatment than female patients (p<.001). Patients within the 31-45 age category and with commercial insurance were also more likely to undergo operative treatment (p<.001) (Table 1). Similarly, at the univariate level, patients who used tobacco (p=0.004), have obesity, have diabetes, and have higher CCI were more likely to undergo non-operative treatment for ATR (p<0.001). Trends in surgical management of ATR have increased over time with proportions of surgical treatment ranging from 15.3% to 17.1% (p<.001) (Figure 1). In a multivariate logistic regression, we found that male, obese and older patients are more likely to undergo surgical management of ATR (p<0.001) (Table 2). However, patients with diabetes and lower CCI were associated with lower odds of surgical management (p<0.001).

DISCUSSION AND CONCLUSION: Overall, our study demonstrates that multiple demographic variables and risk factors are significantly associated with operative management of ATRs between 2017 and 2022. Additionally, there has been an increase in trend in recent years for surgical management of ATR. Future prospective studies are needed to ascertain the root of these associations.

Figure 1. Percentage of Operative Treatment vs. Year of Injury



Table 1. Patient Demographics			
Demographics		Operative N (Row Percentage)	Non-Operative N (Row Percentage)
Sex	Female	9537 (12.5)	66774 (87.5)
	Male	17037 (19.8)	69188 (80.2)
Age	0-15	97 (1.2)	7920 (98.8)
	16-30	3127 (17.0)	15297 (83.0)
	31-45	7735 (22.2)	27046 (77.8)
	46-60	8981 (17.3)	42376 (82.7)
	60+	6628 (13.4)	42851 (86.6)
Year of Injury	2017	4668 (16.1)	24241 (83.9)
	2018	4503 (16.4)	23020 (83.6)
	2019	4892 (16.3)	25594 (83.7)
	2020	3992 (16.7)	19854 (83.3)
	2021	4863 (17.1)	23610 (82.9)
	2022	3556 (15.3)	19943 (84.7)
Insurance	Commercial	22360 (17.2)	107562 (82.8)
	Government	3744 (12.7)	25721 (87.3)
	Other	470 (14.7)	2721 (85.3)
Tobacco Use		8053 (16.0)	42428 (84.0)
Diabetes		6829 (14.0)	42113 (86.0)
Obese (BMI ≥30)		11095 (15.8)	59158 (84.2)
Charleston Comorbidity Index (CCI)		0.89 (1.44*)	1.2 (1.80*)

*These values represent SD.

Table 2. Odds Ratio of Operative Treatment			
Demographic	Odds Ratio	95% CI	P-value
Male	1.71	[1.66, 1.76]	<.001
Age	1.00	[1.00, 1.00]	<.001
Year of Injury	2018	1.01	[0.96, 1.05]
	2019	1.00	[0.96, 1.05]
	2020	1.04	[0.99, 1.09]
	2021	1.05	[1.00, 1.09]
Tobacco Use	2022	0.91	[0.87, 0.96]
			<.001
Diabetes	1.04	[1.01, 1.07]	0.02
Obese	0.86	[0.83, 0.89]	<.001
CCI	1.12	[1.09, 1.15]	<.001
	0.90	[0.89, 0.91]	<.001