

Range of Motion Outcomes after Primary Flexor Tendon Repair when Evaluating for Patient, Injury, and Surgery Specific Factors

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INTRODUCTION:

Flexor tendon lacerations are serious and potentially debilitating injuries, with an incidence of 33.2 per 100,000 person-years. Despite their frequency, there is a paucity of literature examining patient-, injury-, and surgery-specific variables affecting range of motion outcomes following primary flexor tendon repair across all flexor zones.

METHODS:

A retrospective review of patients 18 years of age or older who underwent primary flexor tendon repair between January 1, 2015 and October 1, 2023 was performed. Primary outcomes included total active motion (TAM) defined by the American Society for Surgery of the Hand (ASSH) at the 6 and 12 weeks post-operatively. Descriptive statistics were calculated, and logistic and linear regression models were used to evaluate associations between patient or surgical factors and outcomes.

RESULTS:

There were 397 patients with 523 injured digits included in our study. Average age of the study population was 39.7 years (SD: 16.1) with 281 (70.8%) patients being male. Laceration-type mechanism was most common (74.8%), followed by sawblade (18.1%) and crush (4.5%) injury (Table 1). Injury-specific factors that significantly influenced postoperative ASSH TAM included the affected digit, zone of injury, and presence of concurrent injuries. At 12 weeks, ring and small finger injuries had impaired functional outcomes when compared to the reference (index fingers) with 19.1 and 23.6 degrees less TAM, respectively. Zone 1 digits had improved functional outcomes when compared to the reference (Zone 2) at both 6 and 12 weeks with 47.0 and 33.2 degrees more TAM, respectively. The presence of a concurrent injury was also predictive of worse functional outcomes as a concurrent fracture resulted in 36.6 degrees less TAM at 6 weeks whereas a concurrent digital nerve injury resulted in 18.8 degrees less TAM at 12 weeks (Table 2). No patient- or surgery-specific variables were found to be significant predictors of ASSH TAM outcomes in our cohort.

DISCUSSION AND CONCLUSION:

In our study, we found that injury-specific factors—such as the digit affected, zone of injury, and presence of a concurrent injury—can influence ASSH total active motion (TAM) outcomes following primary flexor tendon repair. These findings can help guide patient counseling by identifying risk factors and setting appropriate expectations for postoperative recovery.

Table 2: Results of Mixed Effects Linear Regressions for Digit-Level Outcomes (ASSH Total Active Motion).

	ASSH Total Active Motion	
	6 Weeks	12 Weeks
Patient-Specific Factors		
Age		
< 30	ref.	ref.
≥ 30, < 50	0.28 (-16.96, 17.51)	2.64 (-16.99, 22.27)
≥ 50	12.76 (-8.62, 34.14)	5.24 (-18.61, 29.10)
Gender		
Female	ref.	ref.
Male	5.41 (-10.47, 21.30)	-4.19 (-22.92, 14.55)
Race/Ethnicity		
Non-Hispanic White	ref.	ref.
Non-Hispanic Black	-19.71 (-39.66, 0.23)	-14.27 (-37.28, 8.75)
Hispanic, Any Race	-21.71 (-55.47, 12.04)	-5.27 (-38.84, 28.30)

Table 1: Descriptive statistics for patient-level variables.

	Total	P Value
Total, N (%)	397 (100%)	—
Patient-Specific Factors		
Age (Mean)	39.7	0.732
Mean (SD)	39.7 (16.1)	
Median (IQR)	34.0 (25.04, 43.96)	
Range (Min, Max)	18.00, 81.00	
N Observed (%)	397 (100.00)	
Age Group (Mean, N (%))		0.279
< 30	147 (36.78)	
≥ 30, < 50	147 (36.78)	
≥ 50, < 70	103 (25.94)	
≥ 70	17 (4.28)	
Gender, N (%)		0.038
Female	118 (29.72)	
Male	281 (70.28)	
Race, N (%)		0.088
White	352 (88.66)	
Black	18 (4.53)	
Other or Unspecified	27 (6.80)	
Ethnicity, N (%)		0.140
Not Hispanic or Latino	359 (90.43)	