



True Story Behind Isolated Hand or Digit Traumatic Amputations: A One-Year Evaluation of Traumatic Amputation Treatment Course and Success of Replantation



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INTRODUCTION

Hand or digit amputations affect approximately 3,100 Americans every year. Although success rates have been reported to be high and patient satisfaction/quality of life improves after replantation, national rates have decreased over the last 20 years. Reasons for this trend are multifactorial but the literature suggests low reimbursements, financial burden to patients and health care systems, and long resource intensive surgeries are the likely nidi. There remains a paucity in the literature of evaluation of longitudinal outcomes of replantation at a national level.

OBJECTIVES

- Determine rates and factors associated with replantation, amputation, revision amputation after replantation for IHDTA nationwide.
- We hypothesized that there are patients who undergo replantation with subsequent revision amputation beyond the initial hospitalization.

METHODS

Adult patients who sustained isolated hand or digital amputation were identified in the **Nationwide Readmission Database** (2010-2019) and followed-up for 6 months. Patients were stratified according to management (replantation attempt, surgical amputation). The primary outcomes were **replantation attempt and failure** within 6 months. Length of stay, readmissions, costs, and trends of replantation over time were also explored. Risk-adjusted modeling was used to determine patient- and hospital-level factors associated with replantation and differences in incremental costs.

RESULTS

A total of **16,856** patients were identified, **2,319 (13.8%)** underwent replantation. This proportion down trended during the study period ($P<0.001$). **8,152 (48.4%)** underwent surgical amputation while **6,384 (37.9%)** received no surgical treatment on initial presentation. Patients were on average 46 years old, male (88%), had no charge/other payor status (34.2%), were in the bottom income quartile (31.2%), and low comorbidity burden (ECI: 0, 54.3%). They were mostly treated at top volume quartile centers (66%), teaching hospitals (76.4%), with large bed size (73.7%). **Replanted patients** tended to be 42 years old, have no charge/other payer status (40.1%), in the highest income quartiles (51st-100th, 49.4%), have lower comorbidity burden (ECI 0, 57.5%), were more likely to be treated at top volume quartile (84.2%), teaching centers (87.6%), with large bed sizes (81%), and had prolonged length of stays (>75th percentile, 60.2%). **Successful replantation** at index admission was **67.2%** with viability of **97.9% 6-months post-discharge**. There was no difference in unplanned readmission between replantation vs. surgical amputation though **replanted patients had longer length of stay** (3.42 days) and **higher costs** (\$13,624). Replanted patients also had higher rates of readmission ($P=0.047$), operative procedures during readmission ($P<0.001$), and higher rates of surgical ($P<0.001$) and non-surgical complications ($P=0.027$). Factors associated with replantation were **higher socioeconomic status** and **admission to high-volume, private not-for profit hospitals**.

FIGURE: Factors Associated with Replantation after IHDTA

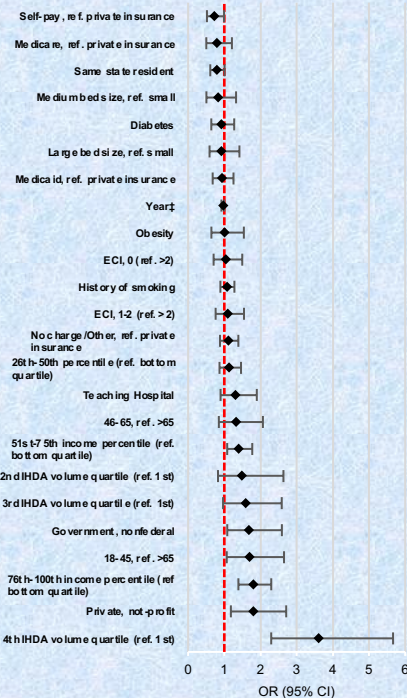


Table: Outcomes by Treatment Modality in Patients Suffering IHDTA

	No surgical treatment		Surgical amputation		Replantation		P
	No.	%	No.	%	No.	%	
Surgery-related complication	163	(2.5)	145	(1.8)	311	(13.4)	<0.001
Non-surgical complication	147	(2.3)	192	(2.4)	102	(4.4)	0.027
Any complication	290	(4.5)	317	(3.9)	371	(16.0)	<0.001
Elective readmission within 180-days	157	(2.5)	132	(1.6)	74	(3.2)	0.047
Unplanned readmission within 180-days	323	(5.1)	365	(4.5)	155	(6.7)	0.056
Operative procedure within 180-days	181	(2.8)	142	(1.7)	110	(4.7)	<0.001
Mean	SD	Mean	SD	Mean	SD		
Index length of stay, mean (SD)	2.8	0.1	2.5	1.0	6.2	0.2	<0.001
Total length of stay (Admission and readmission[s]), mean (SD)	3.3	0.1	2.9	0.1	6.8	0.2	<0.001
Index admission costs, mean (SD)	\$11,169	\$360	\$10,354	\$324	\$24,548	\$795	<0.001
Total costs (Admission and readmission[s]), mean (SD)	\$12,362	\$405	\$11,329	\$354	\$25,987	\$845	<0.001

CONCLUSIONS

Replantation has continued to decrease and occurs only in a small proportion of patients who sustain isolated traumatic hand or digital amputation. Most of these replants remain viable once patients are discharged, and there is a relatively low healthcare utilization in the post-discharge period. As regionalization of hand trauma care is further recognized, development of strategies to maximize efficiency of hand trauma systems while mitigating potential disparities arising from system-level factors affecting the likelihood of replantation are warranted.