

## Cost Analysis of Devascularized Digit Injury Management

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**Purpose:** This study aims to determine how injury patterns, patient-specific variables, and treatment pathways influence the costs and cost-effectiveness of managing devascularized digits.

**Methods:** Patients with traumatically devascularized digits between 2019-2024 were queried through our institution's medical record system using ICD-10 codes. Data included demographics, injury characteristics, outcomes, and unadjusted patient charges. Michigan Hand Outcomes Questionnaire (MHQ) scores were estimated through meta-analysis. Data was analyzed with comparative/regression statistics and incremental cost-effectiveness ratios (ICER).

**Results:** Our analysis included 102 patients, of which 17 had replantation, 23 had revascularization, and 62 had revision amputations. Mean charges were \$100,856 (SD \$34,083) for replantation, \$92,925 (SD \$42,022) for revascularization, and \$39,830 (SD \$67,402) for revision amputations. Failed replants were \$6,699 less than successes (\$98,491 vs. \$105,191;  $P=.72$ ), while failed revascularizations were \$60,579 more than successes (\$132,268 vs. \$81,996;  $P=.02$ ). Hospital length of stay was the most significant association for cost, with each day costing \$15,633 ( $P<.001$ ,  $R^2= 0.77$ ). Leech therapy increased average hospital stay by 6 days for revascularization ( $P=.02$ ) and 3 days for replantation ( $P=.02$ ). Higher Elixhauser Comorbidity Scores showed a significant positive association with charges ( $P=.04$ ,  $R^2=0.26$ ). The estimated MHQ ICER for replants was \$13,974 per MHQ point, with the most cost-effective replant scenario being single non-thumb distal replants (\$11,203) and the least cost-effective being single non-thumb crush/avulsion replants (\$29,970). Revascularizations had an estimated ICER of \$7,793 per MHQ point, with the most cost-effective being multi-digit non-thumb revascularizations (-\$1,412) and least cost-effective being multi-digit non-thumb crush/avulsion revascularizations (\$27,856).

**Conclusion:** There are many factors influencing costs in digit salvage and revision. Failed revascularization was significantly more expensive than successes, but replantation demonstrated no significant difference. The cost-effectiveness of salvage versus revision varied by procedure and injury classification, with multi-digit revascularization being the most cost-effective. Reducing hospital stays and providing cost-effective procedures should be prioritized to optimize cost-efficiency.