



Patient and Injury-related Predictors of Digit Replantation Failure: Implications of Preoperative Nicotine Dependence

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BACKGROUND

- Digit replantation is a technically demanding procedure with significant variability in outcomes.
- Smoking has long been considered a contraindication, but data remains inconsistent.
- This study investigates whether smoking is an independent risk factor for replantation failure, while controlling for patient, injury, and operative variables.

METHODS

Data source: TriNetX federated database of electronic medical records.

Population: Adults undergoing digit replantation.

Primary outcome: Replantation failure, defined as amputation within 1 month of index procedure.

Variables assessed:

- Clinical: Anemia, afib, substance use
- Injury characteristics: Mechanism (i.e machinery), setting where injury occurred (i.e. construction site)
- Operative: Vein graft use

Analysis:

- Relative risks (RR) calculated
- Propensity score matching used to control for confounding variables

RESULTS

Sample size: 2,130 patients

Failure rate: 31% (n=659)

Smokers: 18% (n=380)

Significant Predictors of Replantation Failure		
Risk Factor	Relative Risk (RR)	p-value
Smoking (unadjusted)	2.22	0.007
Anemia	1.43	0.003
Cocaine disorder	1.68	0.04
Machinery injury	1.30	0.003
Construction site injury	1.44	0.003
Vein graft use	1.48	0.0002
White race	1.22	0.01

Table 1. Univariate analysis of relative risks (RR) and p-values for statistically significant predictors of digit replantation failure in an unmatched cohort of 2,130 patients.

Adjusted analysis: Smoking not independently associated with failure (p=0.053)

Replantation attempt rates: Similar between smokers and non-smokers (p=0.12)

DISCUSSION

- Several factors were associated with increased risk of replantation failure, including machinery injury, industrial injury setting, white race, anemia, cocaine use, and vein graft use.
- Smoking showed a strong association in univariate analysis, but lost significance after adjusting for confounders.
- These findings suggest smoking may reflect broader comorbidity risk rather than being a direct cause of failure.
- Replantation was attempted at similar rates in smokers and non-smokers, indicating unbiased selection.
- Identification of modifiable risks (i.e. anemia, intraoperative vein graft use) offers opportunities for perioperative optimization.

CONCLUSION

- Smoking alone should not exclude patients from replantation candidacy.
- Surgeons should focus on a broader set of risk factors including injury characteristics, comorbidities, and surgical complexity to guide surgical decision-making.
- Our findings support more objective and inclusive approaches to improve digit replantation outcomes.

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