

# Predictors of donor-site complications following fibula free flap reconstruction

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## Introduction

- The fibula free flap (FFF) is the workhorse flap for head and neck osteocutaneous reconstruction (1).
- Despite its many advantages, donor-site wound complications are a primary source of morbidity following flap harvest (2).
- Although lower extremity angiography, ultrasound (US), and other vascular studies are routinely used, predictors of donor-site morbidity following harvest remain poorly understood.
- The primary objective of this study was to identify factors associated with FFF donor-site wound complications (DSWC).

## Methods:

- Retrospective analysis of patients undergoing FFF reconstruction at UC Davis during the years 2011-2021
- Multivariable logistic regression was used to identify independent predictors of donor-site wound complications.

## Results

- 119 patients were identified. Majority of patients were male (N = 67, 56.3%) with a mean patient age of 62.6 (range, 17-88) years.
- 62.2% of patients had a history of tobacco abuse while 37.9% reported a history of alcohol abuse.
- Charlson Comorbidity Index (CCI) was tabulated with 67.2%, 21.0%, and 11.8% of patients having 0, 1, and ± 2 comorbidities, respectively.
- The most common indications for FFF reconstruction included squamous cell carcinoma (N = 75, 63.0%).
- The average ankle-brachial index (ABI) was 1.07 (range 0.69 - 1.36) with a mean of 3.7 (± 1.3) perforators identified.
- The average skin paddle harvest size was 73.8 cm<sup>2</sup> (± 48.9).

Patient Variable	Number of Patients (%)		p
	Present DSWC	No DSWC	
<b>History of Tobacco Abuse</b>			
Yes	33 (68.8%)	41 (57.8%)	0.2246
No	15 (31.2%)	30 (42.2%)	
<b>History of Alcohol Abuse</b>			
Yes	25 (52.1%)	20 (28.2%)	<b>0.0083</b>
No	23 (47.9%)	51 (71.8%)	
<b>Diabetes</b>			
Yes	5 (10.4%)	9 (12.7%)	0.7075
No	43 (89.6%)	62 (87.3%)	
<b>History of Radiation or Chemotherapy prior to FFF</b>			
Yes	18 (37.5%)	24 (33.8%)	0.6788
No	30 (62.5%)	47 (66.2%)	
<b>Doppler Study</b>			
Average ABI (harvested leg) [SD]	1.074 (± 0.089)	1.063 (± 0.10)	0.5159*
<b>Flap Characteristic</b>			
Number of perforators (SD)	3.73 (1.4548)	3.69 (1.1413)	0.8763*
Skin Paddle harvest site (SD) [cm <sup>2</sup> ]	75.74 (43.84)	72.41 (50.78)	0.7101*
<b>Method of donor site closure</b>			
Primary closure/Bilateral Advancement Flap	22 (45.8)	49 (69.0%)	<b>0.0368</b>
STSG with bolster or wound vacuum	24 (50.0%)	21 (29.6%)	
Propeller flap	2 (4.2%)	1 (1.4%)	

Table 1. Comparisons of patients by fibula donor-site complication (\*Independent t-test)

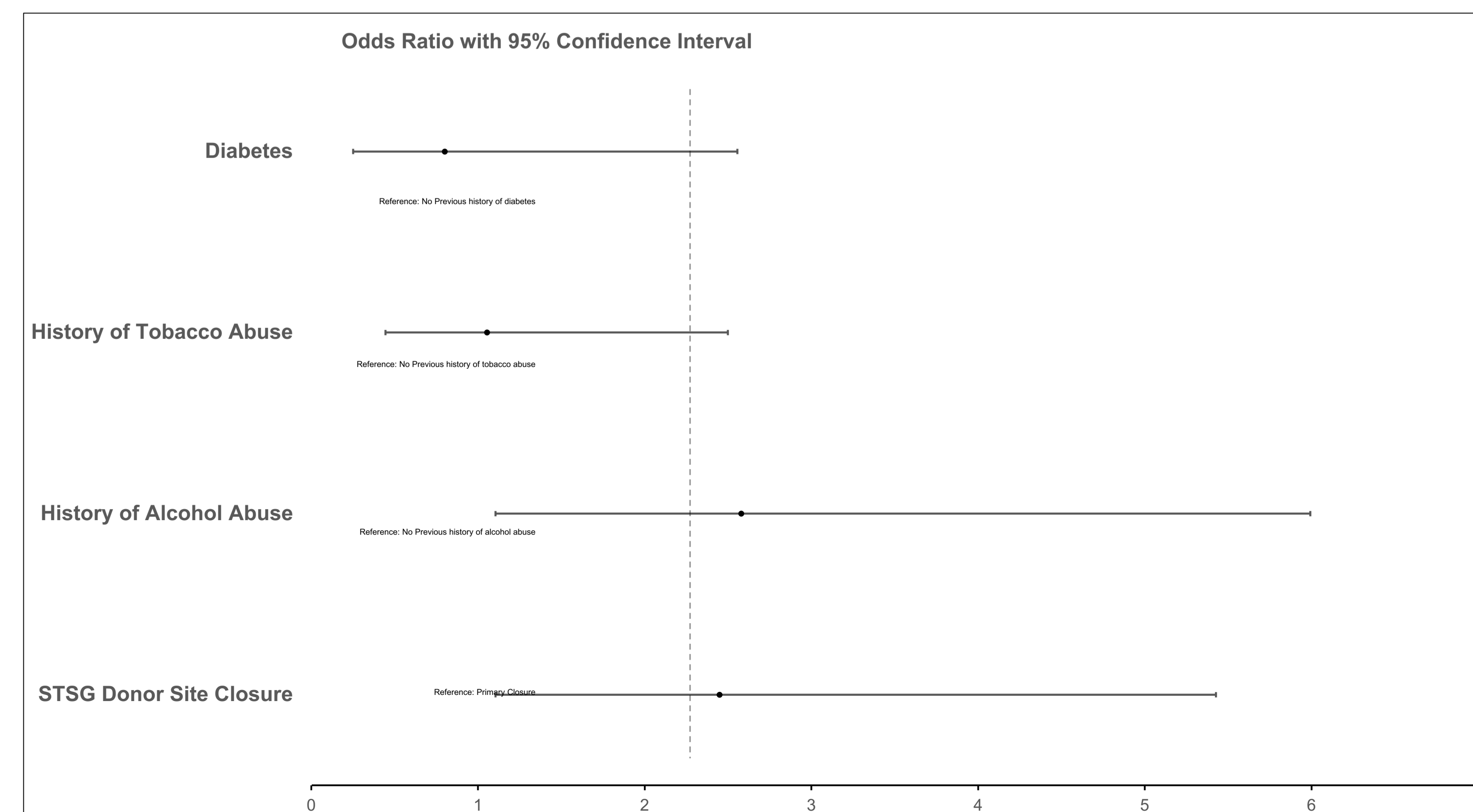


Figure 1. Odds ratio related with multivariable analysis of variables associated with DSWC



Figure 2. Donor site closed through STSG presenting to the clinic with A) postop cellulitis and B) late wound breakdown



Figure 3. Donor site closed primarily presenting to the clinic with A) mild postop cellulitis and B) dehiscence and delayed granulation

## Summary

- A total of 48 (40.3%) patients developed a donor-site wound complication with an average time to diagnosis of 24 days (± 16) following surgery.
- In multivariable regression, history of alcohol abuse (p = 0.0083) and method of donor-site closure (p = 0.0368) were independent predictors of donor-site wound complications.
- STSG closure was associated with a 146% increased odds of wound complications (OR = 2.46, 1.11 – 5.43, 95% confidence interval).
- Patient age, BMI, CCI, skin paddle size, and doppler US characteristics were not predictive of postoperative donor-site morbidity.

## Conclusions/Further Study

- History of alcohol abuse and method of donor-site closure, specifically STSG use, were predictive of donor-site wound complications.
- Donor-site complications following FFF harvest are a significant source of morbidity despite appropriate patient and flap selection following preoperative doppler US.
- We hypothesize that the insufficient vasculature bed needed for skin grafting can result in increased wound morbidity in the patient population.
- This study highlights unique lower extremity doppler US findings in patients undergoing FFF reconstruction in addition to modifiable risk factors associated with fibula donor-site morbidity.

## References

- Shindo M, Fong BP, Funk GF, Karnell LH. The Fibula Osteocutaneous Flap in Head and Neck Reconstruction: A Critical Evaluation of Donor Site Morbidity. *Arch Otolaryngol Head Neck Surg.* 2000;126(12):1467–1472.
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