

Misalignment Between Surgical Complexity And Reimbursement In Free-flap Breast Reconstruction Across BMI Categories



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Background

- Elevated Body Mass Index (BMI) presents unique operative challenges in free-flap breast reconstruction, including difficulty identifying perforators and extensive dissection
- Despite these challenges, CPT coding assigns identical Relative Value Units (RVU) reimbursement regardless of BMI
- This study evaluates the impact of BMI on surgeon compensation under current CPT coding

Methods

- The ACS National Surgical Quality Improvement Program was utilized to identify patients undergoing free-flap breast reconstruction (CPT: 19364) from years 2005-2018
- Patients were classified by BMI using WHO classifications
- Group differences were assessed with t-tests and ANOVA
- A generalized linear model (GLM) evaluated trends between BMI and RVU-per-minute (RVUpM)
- Propensity score matching was performed to control for significant differences in comorbidities
- RVU was converted to US dollars using the Medicare conversion factor (\$32.35 per RVU)

Results

- 8,680 total patients were identified with 1,769 normal weight, 3,153 overweight, and 3,732 obese
- No difference in RVU was found between BMI categories (p=0.974) (Table 1)
- A significant difference was found in RVU per minute between BMI categories (p = 0.001)
- GLM: greater BMI independently decreased RVUpM (β =-0.007, p<0.001).

Table 1: Baseline Patient Characteristics, Comorbidities, and RVU Outcomes

	Underweight (n=26)	Normal BMI (n=1769)	Overweight (n=3153)	Obese (n=3732)	P value
RVU per minute	0.123±.078	0.115±.104*	0.114±.162*	0.103±.119	0.001
Operation time	420.000±151.509*	452.965±153.267†	481.407±168.454*	514.482±177.950	<0.001
RVU	42.580±0.000	42.579±0.042	42.578±0.033	42.578±0.039	0.974
Age	47.000±11.096	50.932±9.581	51.194±9.478	50.344±9.235	<0.001
Diabetes	0(0%)	40(2.3%)	119(3.8%)	355(9.2%)	<0.001
Smoking	1(3.8%)	97(5.5%)	248(7.9%)	280(7.5%)	0.012
COPD	0(0%)	5(0.3%)	10(0.3%)	17(0.5%)	0.695
CHF	0(0%)	0(0%)	1(0.0%)	1(0.0%)	0.910
HTN Medicine	1(7.7%)	216(12.2%)	647(20.5%)	1225(32.8%)	<0.001
Disseminated Cancer	0(0%)	11(0.6%)	32(1.0%)	29(0.8%)	0.460
Steroids	0(0%)	10(0.6%)	34(1.0%)	63(1.7%)	0.003
ASA Classification					<0.001
I	5(19.2%)	118(6.7%)	142(4.5%)	88(2.4%)	
II	13(50.0%)	1081(61.1%)	2007(63.7%)	2036(54.6%)	
III	8(30.8%)	566(32.0%)	996(31.6%)	1589(42.6%)	
IV	0(0%)	3(0.2%)	5(0.2%)	18(0.5%)	
Transfusion	0(0%)	2(0.1%)	1(0.0%)	5(0.1%)	0.558

* significant difference compared to the obese population (p<0.05)

† * significant difference compared to the overweight population (p<0.05)

- Obese vs Normal BMI: Operative times were 62.6 minutes longer and RVU-per-hour was 0.66 lower (p<0.001) → **\$183.75 reimbursement gap**
- Obese vs Overweight: Operative times were 31.8 minutes longer and RVU-per-hour was 0.72 lower (p<0.001) → **\$199.28 reimbursement gap**
- RVU per minute was comparable between overweight and normal BMI patients (p=0.837)

Table 2: Complications of Free Flap Procedures after Propensity Score Matching

Complications	Obese vs. Normal	Obese vs. Overweight	Normal vs. Overweight
Superficial SSI	<0.001	<0.001	0.284
Deep SSI	0.009	0.431	0.199
Organ-space SSI	0.004	0.002	0.507
Wound disruption	<0.001	0.005	0.131
Bleeding	<0.001	0.779	<0.001
DVT	0.041	0.408	0.143
Sepsis	0.006	0.001	1.000

Obese patients also experienced greater superficial **surgical site infection** (SSI), organ space SSI, wound disruption, and **sepsis**

Discussion

- This study demonstrates a misalignment between surgeon effort and reimbursement in free-flap breast reconstruction
- A lower relative compensation was found when operating on high-BMI patients.
- Obese patients have longer operative times with greater complexity, causing a greater level of surgeon stress
- Postoperative care is also more intensive for obese patients, with increased rates of infection and bleeding.
- These findings underscore the need for a CPT modifier or BMI-based adjustments to ensure more equitable surgeon compensation models as obesity rates continue to rise.



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