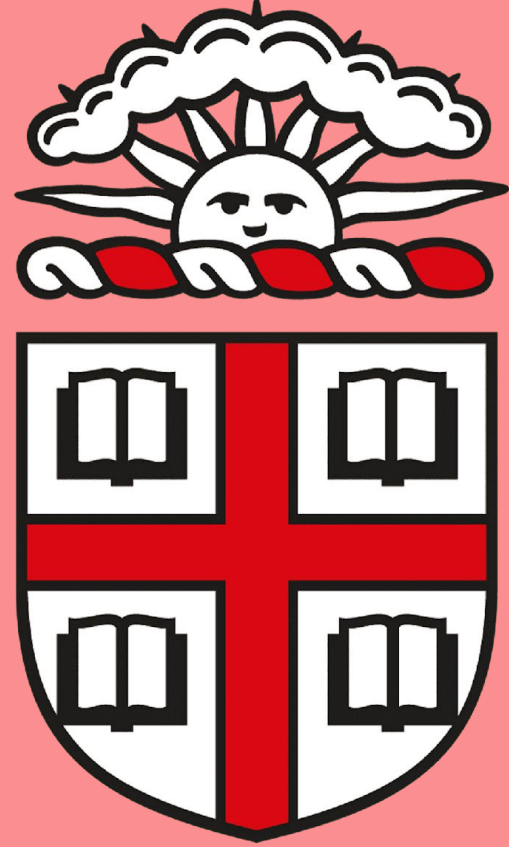




# Ratio of Resected Tissue Mass to Pre-Operative Weight Loss as a Predictor for Post-Operative Complications in Abdominal Contouring Procedures after Massive Weight Loss

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## Background

The global obesity epidemic and growing frequency of bariatric surgeries have heightened the demand for addressing the consequent issue of excess overhanging abdominal pannus through abdominal contouring surgeries. Although these procedures lead to improved mobility, reduced pain, and enhanced quality of life, they also carry a post-operative complication rate of up to 40-50%.

## Objective

To explore the relationship between the ratio of resected tissue mass to pre-operative weight loss (a surrogate for predicted pannus volume) and complication rates in patients undergoing abdominal contouring procedures following massive weight loss.

## Study Design

- Retrospective analysis of patients undergoing abdominal contouring procedures (abdominoplasty or panniculectomy) following massive weight loss.
- Study Period:** April 2015 – February 2023
- Data Source:** Electronic Medical Records
- Independent Variable:** Ratio of resected tissue mass to pre-operative weight loss
- Outcome:** Post-Operative Wound Complications
  - Complications categorized by Clavien Dindo System (Grades 1-4), taking complication severity, and requirement for interventions, reoperations, and readmissions into consideration
  - Hematoma, Seroma, Infection, Dehiscence, Delayed Wound Healing
- Statistics:** Univariate and Multivariate logistical regression model to assess association between the ratio of resected tissue mass to pre-operative weight loss and complication rates
  - Adjusted for age, tobacco use, rectus plication, diabetes, and combined surgery

Table 1: Demographics

|                         | Total (%)     |
|-------------------------|---------------|
| No. patients            | 358           |
| Age ± SD, y             | 46.49 ± 10.67 |
| Gender                  |               |
| Female                  | 307 (85.75)   |
| Male                    | 50 (13.97)    |
| Non-binary              | 1 (0.28)      |
| Tobaccos use            |               |
| Never                   | 201 (56.14)   |
| Former                  | 124 (34.63)   |
| Current                 | 33 (9.21)     |
| Comorbidities           |               |
| Hypertension            | 133 (37.15)   |
| Diabetes                | 73 (20.39)    |
| Inflammatory arthritis  | 7 (1.96)      |
| Obstructive sleep apnea | 127 (35.48)   |
| Depression              | 137 (38.27)   |
| Anxiety                 | 148 (41.34)   |
| Caprini score           |               |
| Low                     | 9 (2.51)      |
| Moderate                | 265 (74.02)   |
| High                    | 76 (21.23)    |
| Very high               | 8 (2.23)      |

## Results

Table 2: Complications classified by Clavien-Dindo severity

|                       | CD1        | CD2        | CD3        | CD4       | Total (%)   |
|-----------------------|------------|------------|------------|-----------|-------------|
| Any complication      |            |            |            |           | 176 (49.16) |
| Hematoma              | 3 (15.79)  | 8 (42.11)  | 8 (42.11)  | 0 (0)     | 19 (5.31)   |
| Seroma                | 2 (5.56)   | 30 (83.33) | 4 (11.11)  | 0 (0)     | 35 (10.05)  |
| Infection             | 4 (10.53)  | 20 (52.63) | 14 (36.84) | 0 (0)     | 38 (10.61)  |
| Dehiscence            | 22 (50.00) | 13 (29.55) | 9 (20.45)  | 0 (0)     | 44 (12.29)  |
| Delayed Wound Healing | 99 (74.44) | 24 (18.05) | 10 (7.52)  | 0 (0)     | 133 (47.15) |
| DVT/PE                | 0 (0)      | 1 (50.00)  | 0 (0)      | 1 (50.00) | 2 (0.56)    |
| Anemia                | 1 (0.125)  | 6 (75.00)  | 1 (12.50)  | 0 (0)     | 8 (2.23)    |
| Other                 | 0 (0)      | 3 (60.0)   | 2 (40.0)   | 0 (0)     | 5 (1.40)    |

Table 3: Ratio of Resected Pannus Mass to Pre-Operative Weight Loss as Predictor for Individual Complications

| Complication                                    | OR   | 95% CI    | p     |
|-------------------------------------------------|------|-----------|-------|
| Hematoma                                        | 1.13 | 0.97-1.31 | 0.11  |
| Seroma                                          | 1.12 | 1.01-1.27 | 0.04  |
| Dehiscence                                      | 1.01 | 0.90-1.14 | 0.82  |
| Anemia                                          | 1.02 | 0.79-1.31 | 0.87  |
| DVT/PE                                          | 1.00 | 0.60-1.67 | 0.99  |
| Infection                                       | 1.17 | 1.05-1.31 | <0.01 |
| Delayed wound healing                           | 0.98 | 0.91-1.07 | 0.76  |
| Any complication                                | 1.05 | 0.98-1.13 | 0.18  |
| Any complication (except delayed wound healing) | 1.09 | 1.01-1.18 | 0.04  |

Table 4: Multivariable Analysis to Assess Predictors of Major Complications

| Predictors of having a major complication      | OR   | 95% CI     | p       |
|------------------------------------------------|------|------------|---------|
| Percent resected weight/percent weight loss, % | 1.11 | 1.04-1.17  | <0.001* |
| Operation Duration                             | 1.00 | 0.99-1.01  | 0.15    |
| Tobacco use                                    | 1.71 | 0.77-3.77  | 0.20    |
| Caprini Score                                  | 4.26 | 0.89-20.34 | 0.24    |
| Diabetes                                       | 1.17 | 0.63-2.20  | 0.61    |
| Combined surgery                               | 0.93 | 0.44-1.98  | 0.85    |
| Age                                            | 0.99 | 0.97-1.02  | 0.95    |

## Results Continued

- Post-operative complications were experienced by 176 (49.2%) patients.
- The average ratio of resected pannus mass to pre-operative weight loss was 5.06 ± 2.71.
- Individual complications:** The ratio of resected pannus weight to pre-operative weight loss was associated with increased rates of seroma (odds ratio, 1.12; P = 0.04) and infection (odds ratio, 1.17; P < 0.01).
- Complications by Clavien Dindo Classification:** The ratio of resected pannus weight to pre-operative weight loss was associated with an increased rate of Clavien-Dindo category 2-4 complications (odds ratio, 1.09; P = 0.03).
- Multivariable logistic regression:** After controlling for age, tobacco use, rectus plication, diabetes, and combined surgery, the ratio of resected pannus mass to pre-operative weight loss remained significantly associated with increased rates of Clavien Dindo category 2-4 complications (odds ratio, 1.10; P = 0.03).

## Conclusions

Higher ratio of resected pannus mass to pre-operative weight loss is associated with increased complications rates in abdominal contouring surgery in massive weight loss patients. This novel predictor may enhance the surgeon's ability to modify post-operative management to prevent such complications.