

# Modified Frailty Index-5 Predicts Complications After Fibula Free Flap Reconstruction for Head and Neck Cancer



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| INTRODUCTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <ul style="list-style-type: none"><li>Fibula free flap reconstruction is the gold standard for mandibular and maxillary defects in head and neck oncology</li><li>These procedures carry substantial perioperative morbidity underscoring the need for accurate preoperative risk stratification.</li><li>Frailty has emerged as a strong predictor of surgical risk, often outperforming traditional comorbidity indices.</li><li>The modified frailty index-5 (mfi-5) is a simple, validated tool for predicting 30-day outcomes, but its role in mandibular or maxillary reconstruction remains unclear.</li></ul> |

| PURPOSE                                                                                                               |
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| To evaluate the predictive value of the mFI-5 for postoperative complications in head and neck cancer reconstruction. |

| METHODS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <ul style="list-style-type: none"><li>A retrospective review of the National Surgical Quality Improvement Program (NSQIP) (2013-2023) was performed.</li><li>Included adult patients undergoing fibula free flap for mandibular or maxillary reconstruction for head and neck malignancy performed by plastic surgery or otolaryngology.</li><li>Demographics, comorbidities, and postoperative outcomes (overall complications, wound complications, reoperation) were collected.</li><li>Frailty was assessed using mFI-5 (diabetes, congestive heart failure, chronic obstructive pulmonary disease, hypertension, functional status).</li><li>Multivariable logistic regression used to evaluate association between mFI-5 and various postoperative outcomes, adjusting for demographic and clinical covariates (body mass index, sex, race, ethnicity, current smoker, bleeding disorder, immunosuppressive therapy, ASA class, and disseminated cancer).</li></ul> |

| RESULTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <ul style="list-style-type: none"><li>1,139 patients underwent fibula free flap reconstruction</li><li>Patients were predominantly male (66.2%), White (80.6), and non-Hispanic (94.2%), with median age of 63.0 years and median body mass index of 25.5 kg/m<sup>2</sup></li><li>mFI-5 score distribution was 0 (44.6%), 1 (44.6%), 2 (13.3%), and 3 (1.7%)<ul style="list-style-type: none"><li>Diabetes: 10.3% non-insulin dependent &amp; 4.7% insulin-dependent</li><li>Hypertension: 48.8%</li><li>COPD: 5.8%</li><li>CHF 1.1%</li><li>Functional status: 98.7% independent, 1.1% partially dependent, 0.2% totally dependent</li></ul></li><li><b>Table 1</b> reports postoperative complication rates by mFI-5.</li><li>Higher mFI-5 scores independently predicted overall complications, wound complications, and reoperation (<b>Table 2</b>).</li><li>Outcome-specific analysis showed that higher mFI-5 scores independently predicted increased risk of dehiscence (OR 1.43, 95% CI 1.00–2.03, p = 0.047) and postoperative transfusion (OR 1.56, 95% CI 1.01–2.41, p = 0.044).</li></ul> |

| TABLE 1. POSTOPERATIVE OUTCOMES BY MFI-5 |                      |                      |                      |                      |                     |       |
|------------------------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|-------|
|                                          | Overall<br>N = 1,139 | mFI-5 = 0<br>N = 508 | mFI-5 = 1<br>N = 460 | mFI-5 = 2<br>N = 152 | mFI-5 = 3<br>N = 19 | p     |
| Overall complication                     | 563 (49.4)           | 243 (47.8)           | 225 (48.9)           | 82 (53.9)            | 13 (68.4)           | 0.208 |
| Wound complication                       | 268 (23.5)           | 119 (23.4)           | 100 (21.7)           | 46 (30.3)            | 3 (15.8)            | 0.168 |
| Superficial incisional SSI               | 268 (23.5)           | 119 (23.4)           | 100 (21.7)           | 46 (30.3)            | 3 (15.8)            | 0.399 |
| Deep incisional SSI                      | 50 (4.4)             | 19 (3.7)             | 21 (4.6)             | 9 (5.9)              | 1 (5.3)             | 0.548 |
| Organ space SSI                          | 60 (5.3)             | 24 (4.7)             | 19 (4.1)             | 16 (10.5)            | 1 (5.3)             | 0.027 |
| Dehiscence                               | 100 (8.8)            | 40 (7.9)             | 42 (9.1)             | 18 (11.8)            | 0 (0.0)             | 0.280 |
| Blood transfusion                        | 81 (10.2)            | 32 (9.1)             | 33 (10.3)            | 13 (11.5)            | 3 (27.3)            | 0.222 |
| Unplanned reoperation                    | 247 (21.7)           | 104 (20.5)           | 102 (22.2)           | 38 (25.0)            | 3 (15.8)            | 0.616 |

Data reported as n (%) or median (range, minimum – maximum); Statistical comparisons performed using chi-square test of independence or Fisher’s exact test. mFI-5, modified frailty index-5; SSI, surgical site infection

| TABLE 2. MULTIVARIABLE REGRESSION    |                       |            |       |                    |            |       |                       |            |        |
|--------------------------------------|-----------------------|------------|-------|--------------------|------------|-------|-----------------------|------------|--------|
|                                      | Overall complications |            |       | Wound complication |            |       | Unplanned reoperation |            |        |
|                                      | OR                    | 95% CI     | p     | OR                 | 95% CI     | p     | OR                    | 95% CI     | p      |
| mFI-5                                | 1.31                  | 1.07, 1.61 | 0.008 | 1.27               | 1.00, 1.61 | 0.050 | 1.31                  | 1.03, 1.66 | 0.027  |
| Body mass index (kg/m <sup>2</sup> ) | 0.98                  | 0.95, 1.00 | 0.032 | 0.99               | 0.97, 1.02 | 0.6   | 0.98                  | 0.96, 1.01 | 0.3    |
| Sex                                  |                       |            |       |                    |            |       |                       |            |        |
| Male                                 | –                     | –          | –     | –                  | –          | –     | –                     | –          | –      |
| Female                               | 1.06                  | 0.79, 1.42 | 0.7   | 0.80               | 0.56, 1.15 | 0.2   | 1.18                  | 0.83, 1.68 | 0.4    |
| Race                                 |                       |            |       |                    |            |       |                       |            |        |
| White                                | –                     | –          | –     | –                  | –          | –     | –                     | –          | –      |
| American Indian or Alaska Native     | 0.58                  | 0.12, 2.27 | 0.4   | 0.50               | 0.03, 2.89 | 0.5   | 1.27                  | 0.18, 5.63 | 0.8    |
| Asian                                | 0.91                  | 0.54, 1.52 | 0.7   | 1.23               | 0.66, 2.19 | 0.5   | 0.72                  | 0.34, 1.42 | 0.4    |
| Black or African-American            | 1.00                  | 0.62, 1.62 | >0.9  | 0.87               | 0.47, 1.53 | 0.6   | 1.06                  | 0.59, 1.82 | 0.9    |
| Native Hawaiian or Pacific Islander  | 1.04                  | 0.24, 4.57 | >0.9  | 1.10               | 0.16, 5.01 | >0.9  | 1.10                  | 0.15, 5.12 | >0.9   |
| Ethnicity - Hispanic                 | 1.74                  | 0.94, 3.31 | 0.082 | 0.72               | 0.29, 1.57 | 0.4   | 0.98                  | 0.43, 2.03 | >0.9   |
| Current smoker                       | 1.38                  | 1.00, 1.90 | 0.049 | 1.41               | 0.96, 2.05 | 0.074 | 1.93                  | 1.33, 2.79 | <0.001 |
| Bleeding disorder                    | 0.48                  | 0.14, 1.40 | 0.2   | 0.53               | 0.08, 1.98 | 0.4   | 0.85                  | 0.19, 2.80 | 0.8    |
| Immunosuppressive therapy            | 0.48                  | 0.14, 1.40 | 0.2   | 0.53               | 0.08, 1.98 | 0.4   | 0.85                  | 0.19, 2.80 | 0.8    |
| ASA Class                            |                       |            |       |                    |            |       |                       |            |        |
| 1 - Healthy                          | –                     | –          | –     | –                  | –          | –     | –                     | –          | –      |
| 2 - Mild disease                     | 0.87                  | 0.08, 19.1 | >0.9  | 0.40               | 0.04, 9.01 | 0.5   | 234,910               | 0.00, NA   | >0.9   |
| 3 - Severe disease                   | 1.39                  | 0.13, 30.4 | 0.8   | 0.44               | 0.04, 9.79 | 0.5   | 366,327               | 0.00, NA   | >0.9   |
| 4 – Life threatening                 | 1.99                  | 0.17, 45.5 | 0.6   | 0.31               | 0.03, 7.30 | 0.4   | 357,709               | 0.00, NA   | >0.9   |
| Disseminated cancer                  | 0.74                  | 0.40, 1.34 | 0.3   | 0.83               | 0.37, 1.70 | 0.6   | 1.32                  | 0.65, 2.54 | 0.4    |

OR, odds ratio; CI, confidence interval; mFI-5, modified frailty index-5; American Society of Anesthesiologists (ASA)

| CONCLUSIONS                                                                                                                                                                                                                                                                                                                                                                          |
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| <ul style="list-style-type: none"><li>Complications occurred in nearly half of patients, highlighting the morbidity of fibula free flap for mandibular or maxillary reconstruction.</li><li>Higher mFI-5 scores independently predicted complications and reoperations, supporting its use for risk stratification, preoperative optimization, and shared decision-making.</li></ul> |

| REFERENCES                                                                                                                                                                                                                                                                                                                                                                                                                      |
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