

# Frailty Indices Outperform Historic Risk Proxies as Predictors of Post-Abdominoplasty Complications: An Analysis of a National Database

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## BACKGROUND

Abdominoplasty is one of the most common aesthetic surgeries in the US. However, complication rates remain variable, with reported 30-day complication rates of up to 52%, and therefore the ability to predict post-abdominoplasty complications remains valuable.

Recent investigations in plastic surgery have identified patient frailty, as measured by the modified 5-item frailty index (mFI-5) or the modified Charlson comorbidity index (mCCI), as valuable predictors of postoperative complications.

## METHODS

The American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) database was retrospectively reviewed for all patients undergoing abdominoplasty (CPT 15847) from 2013-2019. Relevant patient data was gathered and the mFI-5 and mCCI were calculated.

Frailty indices were compared to comorbidities (age, BMI, smoking status, diabetes) as predictors of 30-day complications, readmissions, and reoperations.

## RESULTS

Risk index	Stratification	N	All Complications		Surgical Site Event		Complication Severity		Length of Stay		Readmission		Reoperation	
			Odds Ratio	P value	Odds Ratio	P value	Coefficient	P value	Odds Ratio	P value	Odds Ratio	P value	Odds Ratio	P value
Age	18-49 years	313												
	50-65 years	88	0.85	0.7	1.2	0.74	-0.05	0.83	0.66	0.09	0.7	0.66	1.02	0.98
	≥ 65 years	20	5.27	0.001	3.51	0.074	2.46	<0.00001	12.6	0.014	3.37	0.13	4.86	0.06
BMI	< 25.0 (ref)	97												
	25.0 - 29.9	179	0.99	0.99	2.2	0.32	-0.04	0.85	1.25	0.38	1.05	0.95	0.52	0.65
	≥ 30.0	145	3.31	0.01	4.68	0.05	0.73	0.002	1.77	0.034	2.69	0.22	6.15	0.09
# of major comorbidities	0 (ref)	346												
	1	58	1.17	0.74	0.94	0.92	0.07	0.78	0.73	0.27	1.09	0.91	3.86	0.041
	≥ 2	17	5.54	0.002	1.08	0.95	2.79	<0.00001	5.1	0.032	1.9	0.55	19.28	0.016
History of diabetes	No diabetes (ref)	400												
	Diabetic	21	3.92	0.008	0.86	0.88	2.18	<0.00001	3.01	0.05	1.49	0.71	8.17	0.003
Chronic steroid use	No steroids (ref)	419			Unable to calculate				Unable to calculate		Unable to calculate		Unable to calculate	
	Steroid use	2	8.98	0.12	Unable to calculate		0.55	0.68	Unable to calculate		Unable to calculate		Unable to calculate	
Smoking status	Nonsmoker (ref)	389												
	Smoker	32	1.71	0.3	1.91	0.32	0.9	0.008	1.32	0.47	2.09	0.35	1.22	0.85
ASA class	1 (ref)	159												
	2	212	1.93	0.11	2.18	0.14	0.01	0.97	0.59	0.014	0.74	0.64	1.51	0.56
	≥ 3	50	5.26	<0.001	2.68	0.15	1.15	<0.001	1	1	2.68	0.15	2.17	0.41
mFI-5 score	0 (ref)	349												
	1	58	0.93	0.89	0.95	0.93	0.03	0.78	0.72	0.24	1.1	0.91	3.95	0.04
	≥ 2	14	7.43	<0.001	1.34	0.79	3.46	<1E-10	4.02	0.07	2.36	0.43	58.3	0.006
mCCI score	0 (ref)	303												
	1	79	0.66	0.41	1.02	0.97	-0.06	0.78	0.66	0.1	1.26	0.73	1.29	0.76
	2	29	2.05	0.18	1.42	0.65	0.11	0.75	2.12	0.09	0	0.99	3.67	0.12
	≥ 3	10	9.82	<0.001	4.8	0.06	4.76	<1E-15	6.07	0.09	1.89	0.43	5.5	0.13

Figure 1. Comorbidities, risk factors, and frailty measures as predictors of complications, readmission, and reoperation

Age, BMI, major comorbidities, diabetes, steroid use, smoking status, ASA class, and frailty indices were compared as predictors of adverse outcomes. Both the mCCI and the mFI-5 were strongly and significantly predictive of all-cause complications and complication severity.

In keeping with other previous literature, age, BMI, and history of diabetes were all predictive of at least some complications. There was no comorbidity or other risk factor that was associated with an increased risk of hospital readmission. Rates of chronic steroid use were too low to allow meaningful analysis for certain outcomes measures.

## RESULTS

The strongest predictor of unplanned reoperation was an mFI-5 score of 2 or greater. The strongest predictor of all-cause 30-day complications was also an mFI-5 score of 2 or greater. However, the mCCI rather than the mFI-5 had the strongest association with complication severity.

Of note, smoking status was not associated with all-cause complications, surgical site complications, increased length of stay, readmission, or reoperation rates. Increased BMI was also not associated with reoperation rates.

## CONCLUSIONS

While historically-used risk proxies, including age and BMI, are associated with increased complication rates, complication severity, and postoperative length of stay, both the mCCI and mFI-5 appear to be stronger predictors of adverse outcomes after abdominoplasty. Smoking status does not appear to be a risk factor alone, but may increase complication severity.

As database studies have inherent limits in their validity, further research, such as a prospective study, is required.