



# Risk Factors for Increased Postoperative Pain in Head and Neck Cancer Free Flap Reconstruction Patients

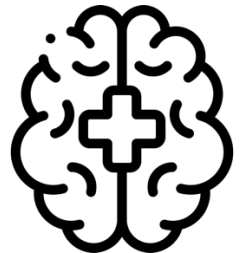
**Daniel R. S. Habib, BA**; Sindhura S. Sridhar, BS; Heezy Suh, BA; Daniel Larson, BS; Brooke B. Swain, BS; Kelly Vittetoe, MD; Donald Sengstack, MS; Michael C. Topf, MD; Melanie D. Hicks, MD

**Daniel Roy Sadek Habib**

MS4 at Vanderbilt University School of Medicine

✉ Daniel.r.habib@Vanderbilt.edu

✕ @danielrshabib





# Pain after Free Flap Reconstruction



- Having no pain management plan is associated with:<sup>1</sup>
  - Longer hospital stay
  - Higher outpatient opioid quantities
  - Increased resource utilization



- Higher rate of post-curative tx pain in HNC (45%) vs other cancer patients (36%)<sup>2-4</sup>
- FFR pain is associated with lower QOL, chronic opioid use, and major depression post-op<sup>3,5</sup>



- Predictors of higher post-op pain scores after FFR:
  - Younger age
  - Comorbid mental health disorders
  - Bony free flaps<sup>6-8</sup>



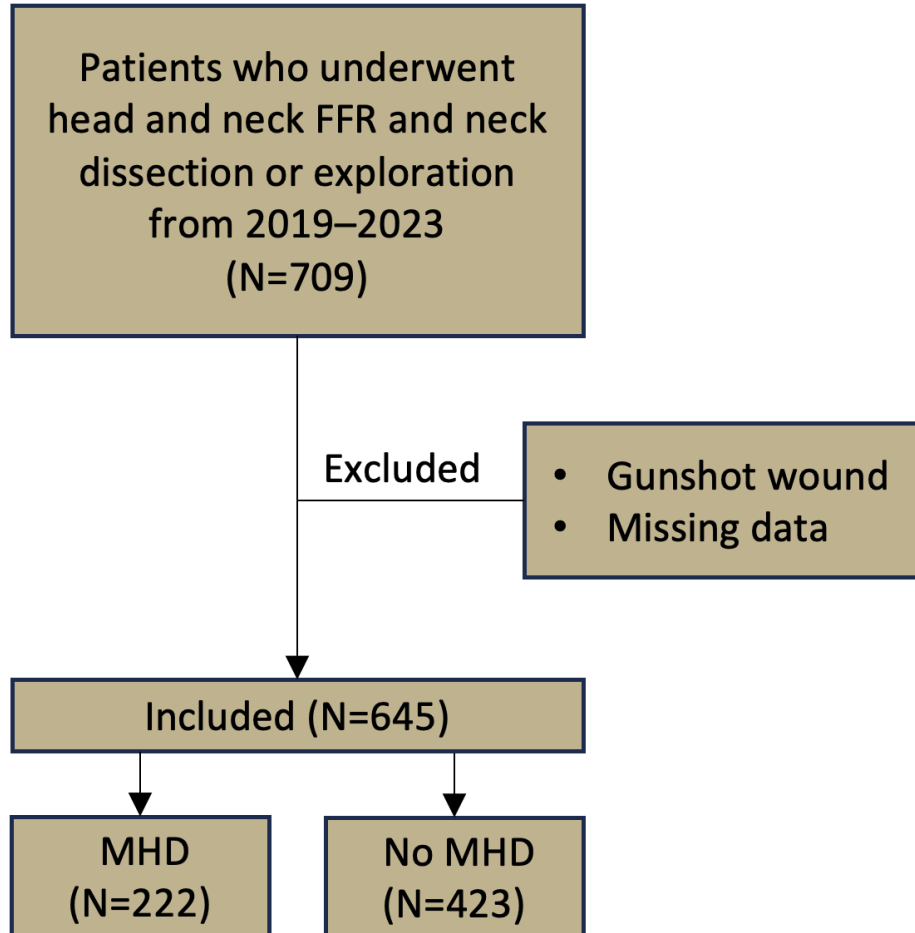
# Hypothesis

Demographic, psychosocial, and surgical factors predict postoperative pain scores and inpatient pain consultations among H&N FFR patients.





## Cohort: Vanderbilt H&N Patients



### Mental Health Disorder:

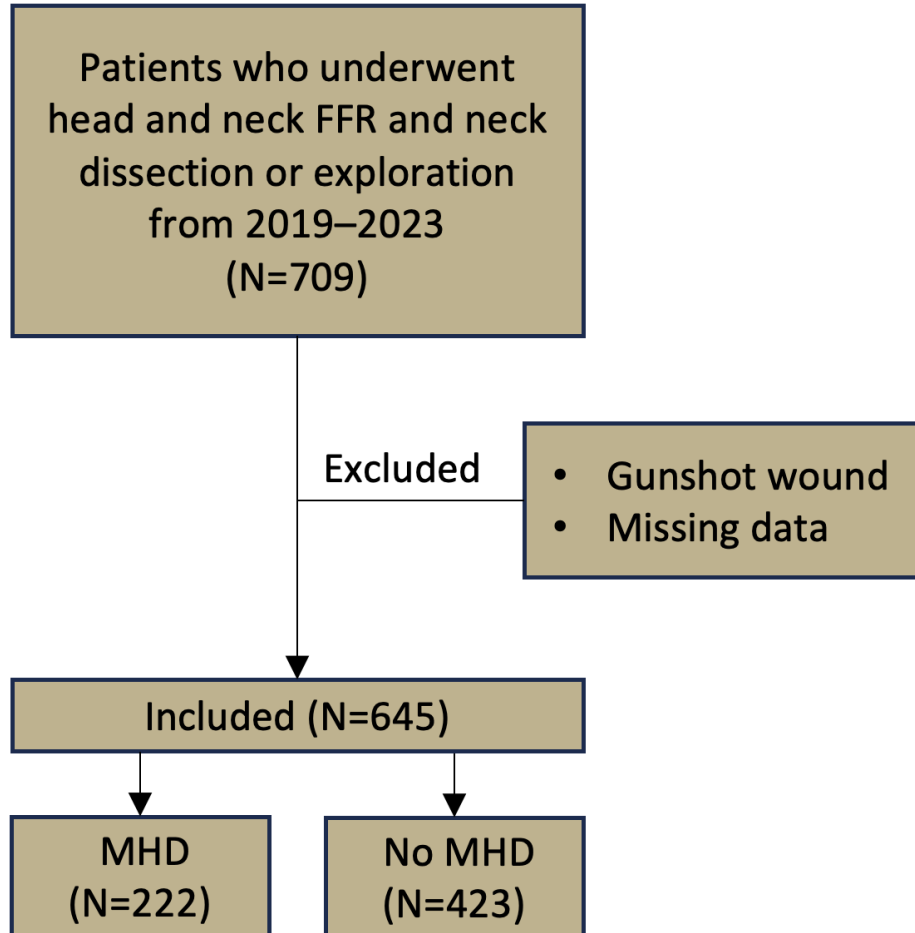
- Depression or anxiety ICD-9/10 code



# Methods



## Cohort: Vanderbilt H&N Patients



### Mental Health Disorder:

- Depression or anxiety ICD-9/10 code

## Analysis

- Compare MHD to no MHD cohort characteristics with Wilcoxon rank-sum (continuous) and Pearson's chi-square / Fisher's exact tests (categorical)
- Linear & logistic regressions by pain score and consultation
  - Covariates: age at surgery, sex, race, marital status, insurance, Comorbidity Index (CDCl), FF site, FF type, indication, MHD, pre-op narcotic rx, and psychiatry consult
- 1:1 propensity matching by 1) MHD and 2) pain consultation among patients with and without MHD
  - Two sample t-tests to compare POD1-5 pain scores

## Outcomes

- Predictors of Average POD5 Pain Score
- Predictors of Inpatient Pain Service Consultation
- Average POD1-5 Pain Scores



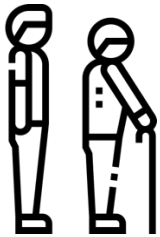


# Cohort Characteristics by Mental Health Disorder

Total cohort: 645

MHD: 222 (34%)

Patients with MHD were more likely to be:



Younger (63 yrs vs 66 yrs)

Female (41% vs 26%)

White (96% vs 89%)

Variable	All, Count (%)	MHD, Count (%)	No MHD, Count (%)	P-Value
Age at Time of Surgery, median [IQR]	65 [57-72]	63 [56-70]	66 [58-72]	.005
Sex				<.001
Female	198 (30.7%)	90 (40.5%)	108 (25.5%)	
Male	447 (69.3%)	132 (59.5%)	315 (74.5%)	
Race				.008
White	591 (91.6%)	213 (95.9%)	378 (89.4%)	
Not white	43 (6.7%)	7 (4.1%)	36 (10.6%)	
Marital Status				.236
Single	126 (19.5%)	45 (20.3%)	81 (19.1%)	
Married / Significant Other	377 (58.4%)	122 (55%)	255 (60.3%)	
Separated / Divorced	75 (11.6%)	33 (14.9%)	42 (9.9%)	
Widowed	59 (9.1%)	18 (8.1%)	41 (9.7%)	
Insurance Type				.091
Private	197 (30.5%)	64 (28.8%)	133 (31.4%)	
Medicare or Other Government	431 (66.8%)	156 (70.3%)	275 (65%)	
Medicaid or None	17 (2.6%)	2 (0.9%)	15 (3.5%)	
CDCI, median [IQR]	4 [3-6]	4.5 [3-6]	4 [3-6]	.919
Site				.167
Oral Cavity	387 (60%)	133 (59.9%)	254 (60%)	
Oropharynx	30 (4.7%)	9 (4.1%)	21 (5%)	
Larynx	108 (16.7%)	48 (21.6%)	60 (14.2%)	
Sinonasal	22 (3.4%)	5 (2.3%)	17 (4%)	
Cutaneous	82 (12.7%)	26 (11.7%)	56 (13.2%)	

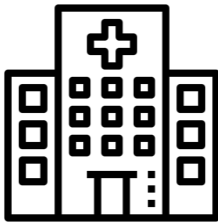


# Cohort Characteristics by Mental Health Disorder (cont.)

Total cohort: 645

MHD: 222 (34%)

Patients with MHD were more likely have:



Pre-op Narcotic Rx (51% vs 37%)

Psych Consult (8% vs 4%)

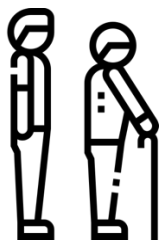
Pain Consult (21% vs 9%)

Variable	All, Count (%)	MHD, Count (%)	No MHD, Count (%)	P-Value
Pathologic T Stage				.403
pT1	30 (4.7%)	15 (6.8%)	15 (3.5%)	
pT2	67 (10.4%)	23 (10.4%)	44 (10.4%)	
pT3	110 (17.1%)	37 (16.7%)	73 (17.3%)	
pT4	262 (40.6%)	93 (41.9%)	169 (40%)	
Pathologic N Stage				.450
pN0	245 (38%)	93 (41.9%)	152 (35.9%)	
pN1	56 (8.7%)	15 (6.8%)	41 (9.7%)	
pN2	65 (10.1%)	22 (9.9%)	43 (10.2%)	
pN3	79 (12.2%)	27 (12.2%)	52 (12.3%)	
Free Flap Type				.376
Fasciocutaneous RFFF	325 (50.4%)	119 (53.6%)	206 (48.7%)	
OCRFFF	122 (18.9%)	46 (20.7%)	76 (18%)	
Anterolateral Thigh	107 (16.6%)	30 (13.5%)	77 (18.2%)	
Fibula	28 (4.3%)	9 (4.1%)	19 (4.5%)	
Other/Multiple	63 (9.8%)	18 (8.1%)	45 (10.6%)	
Indication				.736
Malignancy	391 (60.6%)	130 (58.6%)	261 (61.7%)	
Recurrence	209 (32.4%)	76 (34.2%)	133 (31.4%)	
Other	45 (7%)	16 (7.2%)	29 (6.9%)	
Depression	158 (24.5%)	158 (71.2%)	0 (0%)	NA
Anxiety	160 (24.8%)	160 (72.1%)	0 (0%)	NA
Preoperative Narcotic Rx	266 (41.2%)	112 (50.5%)	154 (36.4%)	<.001
Inpatient Psychiatry Consult	32 (5%)	17 (7.7%)	15 (3.5%)	.022
Inpatient Pain Consult	85 (13.2%)	47 (21.2%)	38 (9%)	<.001



# Predictors of Average POD5 Pain Scores

POD5 pain was associated with:



- Younger Age
- White Race
- Being Separated/Divorced

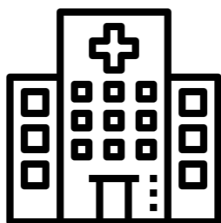
Variable	Univariable		Multivariable	
	$\beta$ (95% CI)	P Value	$\beta$ (95% CI)	P Value
Age at Time of Surgery	-0.06 (-0.08, -0.05)	<b>&lt;.001</b>	-0.06 (-0.08, -0.04)	<b>&lt;.001</b>
Female Sex (vs Male)	-0.06 (-0.46, 0.34)	.771	-0.06 (-0.47, 0.35)	.769
Non-white Race (vs white)	-0.43 (-1.15, 0.29)	.246	-0.70 (-1.40, -0.01)	<b>.047</b>
Marital Status				
Single	0.39 (-0.08, 0.86)	.107	Reference	NA
Married / Significant Other	-0.39 (-0.77, -0.01)	<b>.047</b>	-0.08 (-0.57, 0.4)	.743
Separated / Divorced	0.98 (0.40, 1.56)	<b>.001</b>	0.69 (0.02, 1.35)	<b>.044</b>
Widowed	-0.83 (-1.48, -0.19)	<b>.011</b>	-0.06 (-0.83, 0.7)	.869
Private Insurance (vs Not)	-0.44 (-0.85, -0.03)	<b>.035</b>	0.18 (-0.28, 0.64)	.439
CDCI	-0.14 (-0.22, -0.07)	<b>&lt;.001</b>	-0.03 (-0.11, 0.06)	.554
Site				
Oral Cavity	-0.09 (-0.49, 0.32)	.676	Reference	NA
Oropharynx	-0.39 (-1.23, 0.45)	.368	-0.11 (-0.98, 0.77)	.812
Larynx	0.65 (0.17, 1.13)	<b>.008</b>	0.57 (0.04, 1.09)	<b>.034</b>
Sinonasal/Cutaneous	-0.74 (-1.39, -0.08)	<b>.028</b>	-0.31 (-0.99, 0.36)	.362
Free Flap Type				
Fasciocutaneous RFFF	-0.27 (-0.65, 0.11)	.162	Reference	NA
OCRFF	0.01 (-0.44, 0.47)	.949	0.62 (0.13, 1.12)	<b>.014</b>
Anterolateral Thigh	0.24 (-0.30, 0.78)	.380	0.66 (0.09, 1.23)	<b>.023</b>
Fibula	0.57 (-0.33, 1.48)	.212	0.65 (-0.25, 1.55)	.158
Other/Multiple	0.11 (-0.52, 0.74)	.733	0.19 (-0.46, 0.85)	.563
Indication				
Malignancy	-0.17 (-0.56, 0.22)	.403	Reference	NA
Recurrence	-0.08 (-0.49, 0.33)	.707	-0.03 (-0.46, 0.41)	.909
Other	0.94 (0.17, 1.71)	<b>.017</b>	0.79 (0.00, 1.58)	<b>.049</b>
MHD	0.75 (0.37, 1.14)	<b>&lt;.001</b>	0.47 (0.08, 0.86)	<b>.018</b>
Pre-Op Narcotic Rx	0.78 (0.40, 1.16)	<b>&lt;.001</b>	0.39 (0.00, 0.77)	.051
Psychiatry Consult	0.42 (-0.41, 1.25)	.320	-0.14 (-0.94, 0.67)	.742



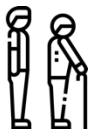


# Predictors of Average POD5 Pain Scores

POD5 pain was associated with:



- Laryngeal Site
- OCRFF or ALT
- Non-Malignant Indication

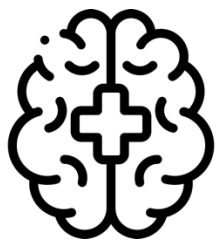


Variable	Univariable		Multivariable	
	$\beta$ (95% CI)	P Value	$\beta$ (95% CI)	P Value
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Female Sex (vs Male)	-0.06 (-0.46, 0.34)	.771	-0.06 (-0.47, 0.35)	.769
Non-white Race (vs white)	-0.43 (-1.15, 0.29)	.246	-0.70 (-1.40, -0.01)	<b>.047</b>
Marital Status				
Single	0.39 (-0.08, 0.86)	.107	Reference	NA
Married / Significant Other	-0.39 (-0.77, -0.01)	<b>.047</b>	-0.08 (-0.57, 0.4)	.743
Separated / Divorced	0.98 (0.40, 1.56)	<b>.001</b>	0.69 (0.02, 1.35)	<b>.044</b>
Widowed	-0.83 (-1.48, -0.19)	<b>.011</b>	-0.06 (-0.83, 0.7)	.869
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Site				
Oral Cavity	-0.09 (-0.49, 0.32)	.676	Reference	NA
Oropharynx	-0.39 (-1.23, 0.45)	.368	-0.11 (-0.98, 0.77)	.812
Larynx	0.65 (0.17, 1.13)	<b>.008</b>	0.57 (0.04, 1.09)	<b>.034</b>
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Other	0.94 (0.17, 1.71)	<b>.017</b>	0.79 (0.00, 1.58)	<b>.049</b>
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Pre-Op Narcotic Rx	0.78 (0.40, 1.16)	<b>&lt;.001</b>	0.39 (0.00, 0.77)	.051
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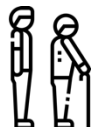


# Predictors of Average POD5 Pain Scores

POD5 pain was associated with:



- MHD

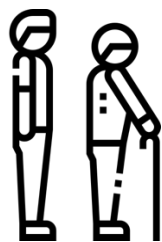


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Psychiatry Consult	0.42 (-0.41, 1.25)	.320	-0.14 (-0.94, 0.67)	.742



# Predictors of Pain Consultation

Pain consultation was associated with:



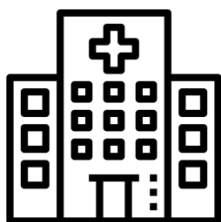
- Younger Age
- Private Insurance

Variable	Univariable		Multivariable	
	OR (95% CI)	P Value	aOR (95% CI)	P Value
Age at Time of Surgery	0.96 (0.94, 0.98)	<b>&lt;.001</b>	0.96 (0.93, 0.98)	<b>.002</b>
Female Sex (vs Male)	1.13 (0.69, 1.83)	.630	0.96 (0.54, 1.72)	.893
Non-white Race (vs white)	1.05 (0.43, 2.57)	.913	0.63 (0.20, 1.93)	.417
Marital Status				
Single	1.77 (1.05, 2.97)	<b>.032</b>	Reference	NA
Married / Significant Other	0.55 (0.35, 0.87)	<b>.011</b>	0.95 (0.49, 1.85)	.883
Separated / Divorced	1.79 (0.96, 3.32)	.066	1.47 (0.64, 3.41)	.365
Widowed	0.73 (0.30, 1.74)	.474	1.05 (0.34, 3.25)	.937
Private Insurance (vs Not)	1.50 (0.88, 2.56)	.134	2.39 (1.21, 4.73)	<b>.012</b>
CDCI	0.88 (0.79, 0.97)	<b>.015</b>	0.90 (0.80, 1.01)	.085
Site				
Oral Cavity	0.94 (0.59, 1.51)	.796	Reference	NA
Oropharynx	0.72 (0.21, 2.43)	.598	2.02 (0.50, 8.17)	.326
Larynx	1.93 (1.13, 3.31)	<b>.017</b>	1.94 (0.95, 3.98)	.070
Sinonasal/Cutaneous	0.50 (0.23, 1.07)	.074	0.62 (0.24, 1.63)	.333
Free Flap Type				
Fasciocutaneous RFFF	0.65 (0.41, 1.04)	<b>.070</b>	Reference	NA
OCRFF	1.38 (0.8, 2.38)	.245	3.19 (1.50, 6.75)	<b>.003</b>
Anterolateral Thigh	0.80 (0.42, 1.54)	.512	1.48 (0.64, 3.41)	.355
Fibula	1.46 (0.54, 3.95)	.457	1.61 (0.46, 5.61)	.454
Other/Multiple	1.84 (0.95, 3.56)	.069	1.98 (0.84, 4.66)	.118
Indication				
Malignancy	0.87 (0.55, 1.38)	.547	Reference	NA
Recurrence	0.85 (0.52, 1.4)	.527	0.68 (0.36, 1.28)	.235
Other	2.30 (1.12, 4.73)	<b>.024</b>	2.05 (0.82, 5.15)	.126
MHD	2.72 (1.71, 4.33)	<b>&lt;.001</b>	2.15 (1.26, 3.67)	<b>.005</b>
Pre-Op Narcotic Rx	3.42 (2.11, 5.55)	<b>&lt;.001</b>	2.91 (1.66, 5.08)	<b>&lt;.001</b>
Psychiatry Consult	2.32 (1.01, 5.35)	<b>.048</b>	1.29 (0.47, 3.54)	.623

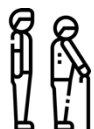


# Predictors of Pain Consultation

Pain consultation was associated with:



- OCRFF

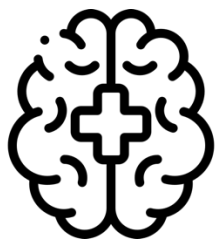


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Non-white Race (vs white)	1.05 (0.43, 2.57)	.913	0.63 (0.20, 1.93)	.417
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Fasciocutaneous RFFF	0.65 (0.41, 1.04)	<b>.070</b>	Reference	NA
OCRFF	1.38 (0.8, 2.38)	.245	3.19 (1.50, 6.75)	<b>.003</b>
Anterolateral Thigh	0.80 (0.42, 1.54)	.512	1.48 (0.64, 3.41)	.355
Fibula	1.46 (0.54, 3.95)	.457	1.61 (0.46, 5.61)	.454
Other/Multiple	1.84 (0.95, 3.56)	.069	1.98 (0.84, 4.66)	.118
Indication				
Malignancy	0.87 (0.55, 1.38)	.547	Reference	NA
Recurrence	0.85 (0.52, 1.4)	.527	0.68 (0.36, 1.28)	.235
Other	2.30 (1.12, 4.73)	<b>.024</b>	2.05 (0.82, 5.15)	.126
MHD	2.72 (1.71, 4.33)	<b>&lt;.001</b>	2.15 (1.26, 3.67)	<b>.005</b>
Pre-Op Narcotic Rx	3.42 (2.11, 5.55)	<b>&lt;.001</b>	2.91 (1.66, 5.08)	<b>&lt;.001</b>
Psychiatry Consult	2.32 (1.01, 5.35)	<b>.048</b>	1.29 (0.47, 3.54)	.623

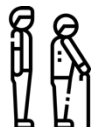


# Predictors of Pain Consultation

Pain consultation was associated with:



- MHD
- Pre-Op Narcotic Rx

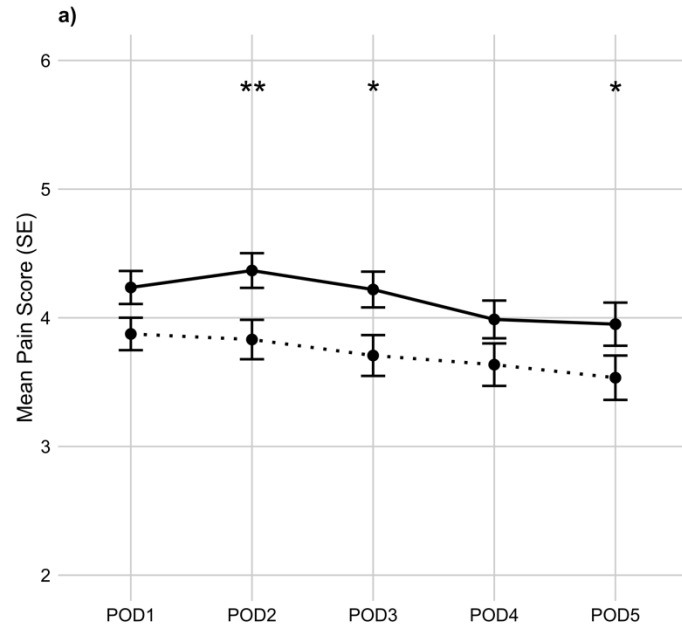


Variable	Univariable		Multivariable	
	OR (95% CI)	P Value	aOR (95% CI)	P Value
Age at Time of Surgery	0.96 (0.94, 0.98)	<b>&lt;.001</b>	0.96 (0.93, 0.98)	<b>.002</b>
Female Sex (vs Male)	1.13 (0.69, 1.83)	.630	0.96 (0.54, 1.72)	.893
Non-white Race (vs white)	1.05 (0.43, 2.57)	.913	0.63 (0.20, 1.93)	.417
Marital Status				
Single	1.77 (1.05, 2.97)	<b>.032</b>	Reference	NA
Married / Significant Other	0.55 (0.35, 0.87)	<b>.011</b>	0.95 (0.49, 1.85)	.883
Separated / Divorced	1.79 (0.96, 3.32)	.066	1.47 (0.64, 3.41)	.365
Widowed	0.73 (0.30, 1.74)	.474	1.05 (0.34, 3.25)	.937
Private Insurance (vs Not)	1.50 (0.88, 2.56)	.134	2.39 (1.21, 4.73)	<b>.012</b>
CDCI	0.88 (0.79, 0.97)	<b>.015</b>	0.90 (0.80, 1.01)	.085
Site				
Oral Cavity	0.94 (0.59, 1.51)	.796	Reference	NA
Oropharynx	0.72 (0.21, 2.43)	.598	2.02 (0.50, 8.17)	.326
Larynx	1.93 (1.13, 3.31)	<b>.017</b>	1.94 (0.95, 3.98)	.070
Sinonasal/Cutaneous	0.50 (0.23, 1.07)	.074	0.62 (0.24, 1.63)	.333
Free Flap Type				
Fasciocutaneous RFFF	0.65 (0.41, 1.04)	<b>.070</b>	Reference	NA
OCRFF	1.38 (0.8, 2.38)	.245	3.19 (1.50, 6.75)	<b>.003</b>
Anterolateral Thigh	0.80 (0.42, 1.54)	.512	1.48 (0.64, 3.41)	.355
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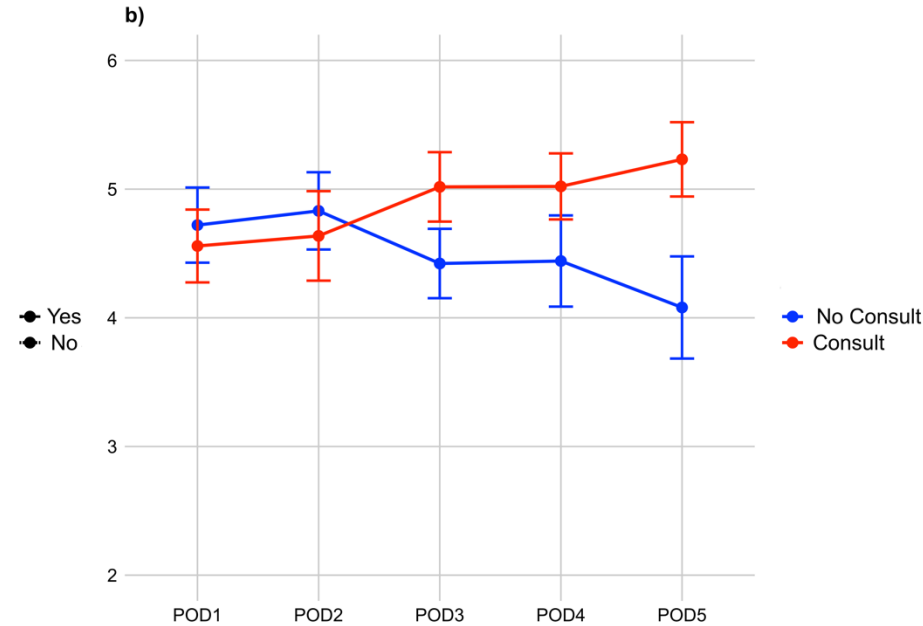


# Average Post-Op Pain Scores by MHD and Pain Consult

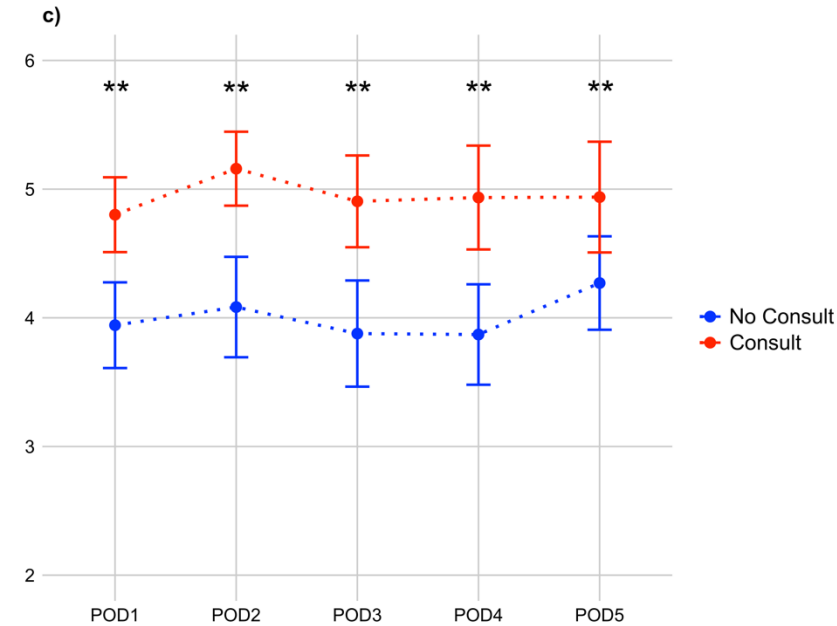
By Presence of MHD (N=396)



With MHD By Pain Consult (N=70)



Without MHD By Pain Consult (N=62)



- Significant post-op pain score difference by MHD
  - Among patients with MHD: No significant difference by pain consult
  - Among patients without MHD: Significant difference by pain consult



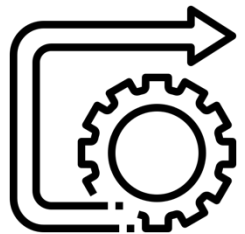
# Discussion

## Limitations



- Retrospective
- Single-institution and relatively small sample of non-white patients
- Pain scale as pain proxy
- Uncaptured factors that influence pain

## Implications



- Proactive pain management and pre-op connection to rehab programs
- Prospective studies to tease out mechanisms behind pain differences
- Multi-institutional cohort for impact of mental health and sociodemographic factors on pain



# Conclusion



- Higher POD5 pain was independently associated with:



Younger age, White race, Separated / divorced marital status



Laryngeal site, OCRFFF or ALT



MHD



- Pain service consultation was more likely among patients with:



Younger age, private insurance



OCRFFF



MHD, preoperative narcotic rx



- Peri-op pain management tailored to individual risk factors may enhance post-op recovery and long-term outcomes.





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Thank you!

Questions?

**Daniel Roy Sadek Habib**

MS4 at Vanderbilt University School of Medicine

✉ Daniel.r.habib@Vanderbilt.edu

✕ @danielrshabib

Slides



SCAN ME