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An NCI-Designated Cancer Center

Functional Outcomes After Robotic Assisted Salvage Surgery for Oropharyngeal Cancer

Michael Bobian, MD

Department of Otolaryngology – Head and Neck Surgery

Medical University of South Carolina

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Disclosures

No financial disclosures or conflicts of interest

Nonfinancial: No relevant nonfinancial relationship to disclose

Oropharyngeal squamous cell carcinoma is common



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Oropharyngeal squamous cell carcinoma is common

OPC is the most common mucosal malignancy of the head and neck

>70% of new cases are HPV associated, afflicting young, healthy, non-smokers

Rates continue to rise amid the HPV epidemic

Prognosis and functional outcomes after treatment of primary OPC are favorable

Research

JAMA Otolaryngology-Head & Neck Surgery | [Original Investigation](#)

Dysphagia After Primary Transoral Robotic Surgery With Neck Dissection vs Nonsurgical Therapy in Patients With Low- to Intermediate-Risk Oropharyngeal Cancer

Katherine A. Hutcheson, PhD; Carla L. Warneke, MS; Christopher M. K. L. Yao, MD; Jhankruti Zaveri, MPH; Baher E. Elgohari, MD; Ryan Goepfert, MD; Amy C. Hessel, MD; Michael E. Kupferman, MD; Stephen Y. Lai, MD, PhD; C. David Fuller, MD, PhD; G. Brandon Gunn, MD; Adam S. Garden, MD; Faye Johnson, MD, PhD; Renata Ferrarotto, MD; Jan S. Lewin, PhD; Neil D. Gross, MD; for the MD Anderson Head and Neck Cancer Symptom Working Group

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Table 2. Longitudinal MBS Dysphagia Grade (per DIGEST) by Primary Treatment Group

DIGEST Score	No. (%) of Patients (95% CI)		Cramer V (95% CI) ^a
	Primary TORS Group (n = 75)	Primary Radiotherapy Group (n = 182)	
At 3-6 mo			
Grade 0	25 (33.3) [22.9 to 45.2]	72 (39.6) [32.4 to 47.1]	0.18 (0.06 to 0.28)
Grade 1 (mild)	29 (38.7) [27.6 to 50.6]	47 (25.8) [19.6 to 32.8]	
Grade 2 (moderate)	4 (5.3) [1.5 to 13.1]	23 (12.6) [8.2 to 18.4]	
Grade 3 (severe)	1 (1.3) [0.0 to 7.2]	6 (3.3) [1.2 to 7.0]	
Missing	16 (21.3) [12.7 to 32.3]	34 (18.7) [13.3 to 25.1]	
Prevalence DIGEST grade ≥2	5 (6.7) [2.2 to 14.9]	29 (15.9) [10.9 to 22.1]	-0.14 (-0.23 to -0.01)

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Head

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Unfortunately, at least 17% patients have local or regional recurrence

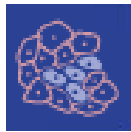
What are we doing to mitigate adverse outcomes for recurrent oropharyngeal squamous cell carcinoma?



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What are we doing to improve outcomes for recurrent oropharyngeal squamous cell carcinoma?



cancers



Review

The Lack of Standardized Outcomes for Surgical Salvage of HPV-Positive Recurrent Oropharyngeal Squamous Cell Carcinoma: A Systematic Scoping Review

April N. Taniguchi ^{1,2} , Sarah R. Sutton ^{1,3} , Shaun A. Nguyen ^{1,*} , Alexandra E. Kejner ¹ 
and William G. Albergotti ¹

¹ Department of Otolaryngology-Head and Neck Surgery, Medical University of South Carolina, Charleston, SC 29425, USA

² College of Medicine, University of Central Florida, Orlando, FL 32827, USA

³ School of Medicine, University of Nevada, Reno, NV 89557, USA

* Correspondence: nguyensh@musc.edu; Tel.: +1-843-792-1356

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cancers



Salvage surgery often remains a key treatment option for locoregional recurrent oropharyngeal squamous cell carcinoma

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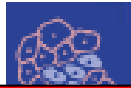
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cancers



Salvage surgery often remains a key treatment option for locoregional recurrent oropharyngeal squamous cell carcinoma

Traditional approaches to the oropharynx are morbid and carry significant long term functional limitations

and William G. Albergotti ¹

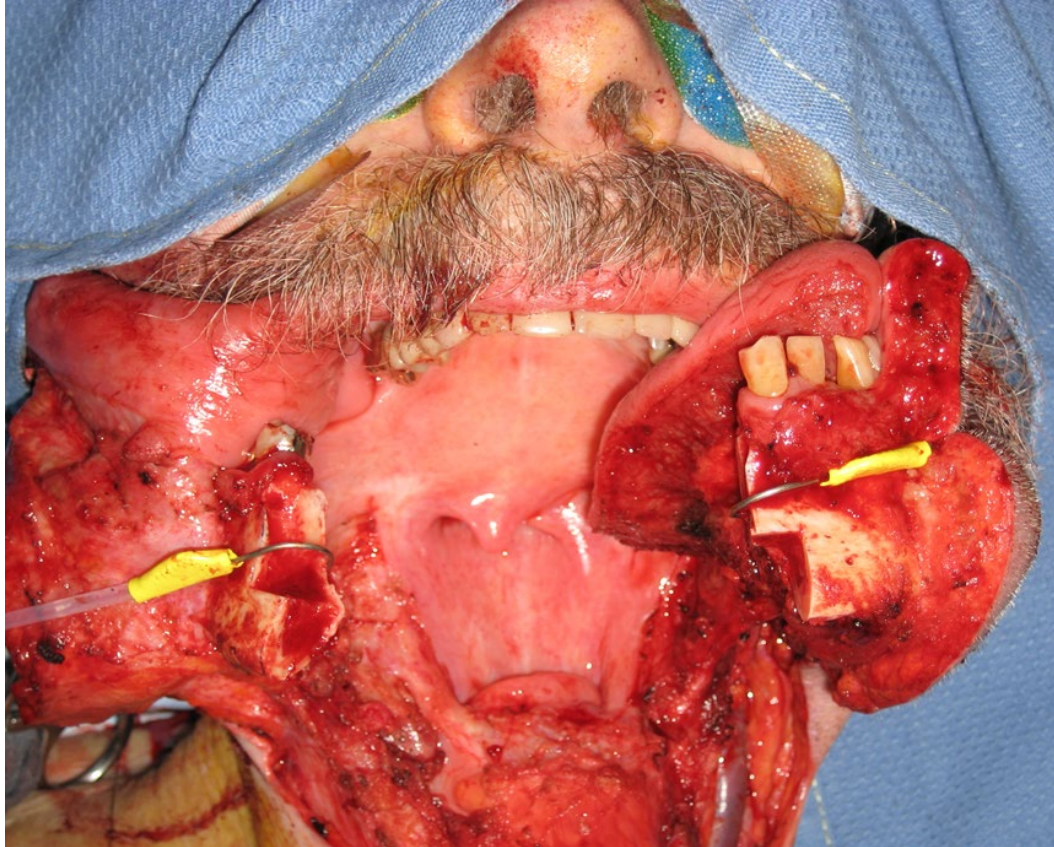
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Lip-split mandibulotomy



- Excellent access, good for significant trismus
- Must osteotomize mandible (often radiated in salvage setting)
- Traditionally requires lip split incision
- Divided floor of mouth musculature
- CNXII often non-salvageable

Transhyoid and lateral pharyngotomy

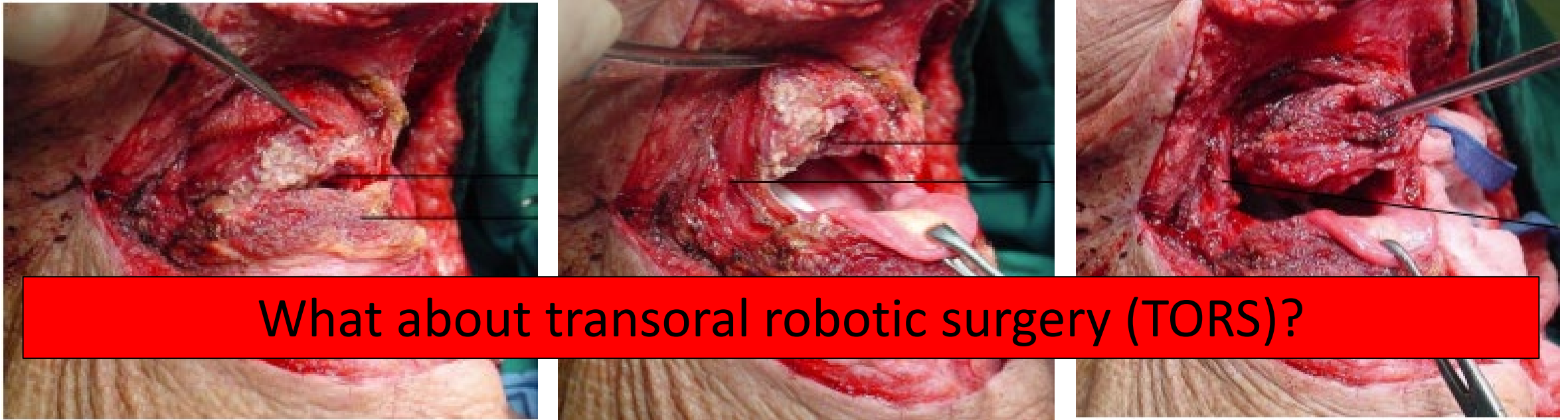


Offers excellent exposure to lateral pharynx and even hypopharynx but ENTRY IS OFTEN BLIND

Can be used for tumors involving the mandible (w/ posterior mandibulectomy & offers ability to address trismus if needed)

Limited access to base of tongue if no mandibulectomy and no pull through is performed.

Transhyoid and lateral pharyngotomy



What about transoral robotic surgery (TORS)?

Offers excellent exposure to lateral pharynx and even hypopharynx but ENTRY IS OFTEN BLIND

Can be used for tumors involving the mandible (w/ posterior mandibulectomy & offers ability to address trismus if needed)

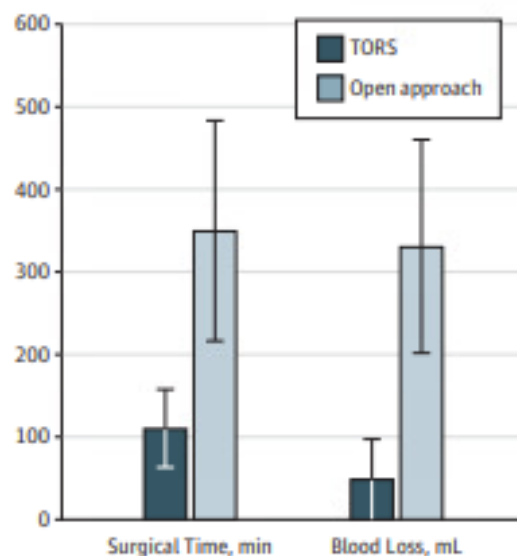
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Original Investigation

Salvage Surgery for Recurrent Cancers of the Oropharynx Comparing TORS With Standard Open Surgical Approaches

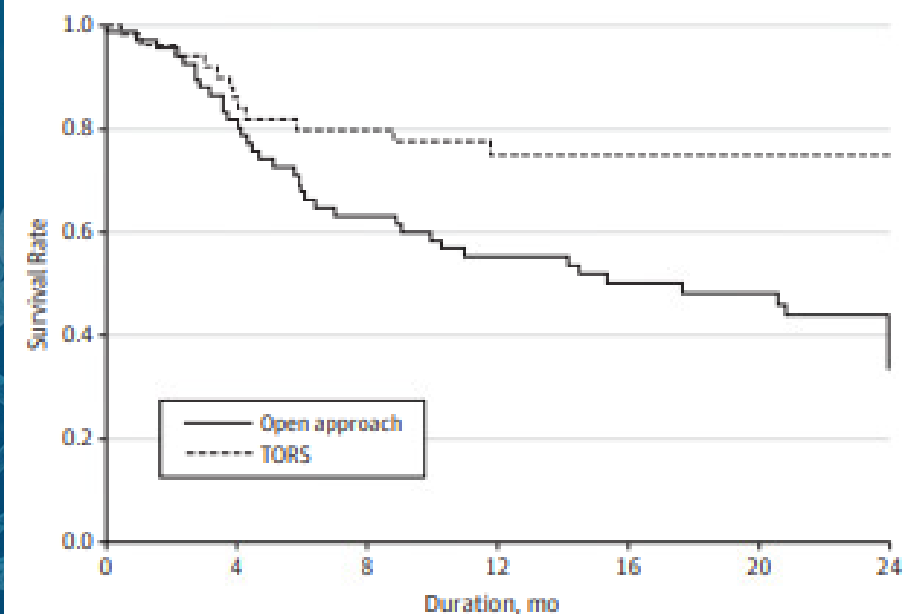
Hilliary White, MD; Samuel Ford, BS; Benjamin Bush, MD; F. Christopher Holsinger, MD; Eric Moore, MD;
Tamer Ghanem, MD, PhD; William Carroll, MD; Eben Rosenthal, MD; Larissa Sweeny, MD; J. Scott Magnuson, MD

Figure 1. Comparison of Operative Time and Blood Loss Between TORS vs Open Salvage Surgery of the Oropharynx



TORS indicates transoral robotic-assisted surgery. Error bars indicate standard deviations.

Figure 6. Two-Year Recurrence-Free Survival



TORS indicates transoral robotic-assisted surgery.

Article

Transoral Robotic Surgery for the Salvage of Primarily Irradiated Oropharyngeal Squamous Cell Carcinomas Recurring at the Base of the Tongue: A Small Monoinstitutional Series

Samuele Frasconi ^{1,*}, Davide Rizzo ^{1,2}, Roberto Gallus ³, Nikolaos Machouchas ¹, Sergio Cannova ², Dan Marian Fliss ⁴, Jacopo Galli ⁵ and Francesco Bussu ^{1,2}

Table 2. Summary of the clinical history of the 4 study patients who underwent salvage TORS.

Case	Age at Diagnosis (Years)	cT	cN	HPV Status (E6/E7 mRNA on Fresh Sample)	Time to TORS Salvage (Months)	Pre-Op Composite MDADI	rT #	rN #	G, PNI	Post-Op Composite MDADI	Post-TORS Relapse	Dead/Alive	Last Follow-Up After TORS (Months)
1 *	49	4	2c	Positive	65	69	1	0	II, -	73	No	Alive	105
2 *	60	4	2c	Negative	24	68	2	0	III, -	66	No	DOC	72
3	69	1	2b	Negative	18	66	2	0	III, +	-	Yes (time to relapse 3 months)	DOD	11
4	74	3	2c	Negative	9	68	2	2c	II, -	70	No	Alive	96

cT, clinical T classification; cN, clinical N classification; HPV, human papilloma virus; TORS, transoral robotic surgery; MDADI, MD Anderson Dysphagia Inventory; rT, T classification of the recurrence; rN, N classification of recurrence; DOC, dead of other causes; DOD, dead of disease; PNI, perineural invasion, + present, - absent. * Details of Cases 1 and 2 are shown in Figure 1. # The r staging always corresponded to the final pathological (p) staging.

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What about larger tumors which require reconstruction?

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Case Series



Feasibility of Free Flap Reconstruction Following Salvage Robotic-Assisted Resection of Recurrent and Residual Oropharyngeal Cancer in 3 Patients

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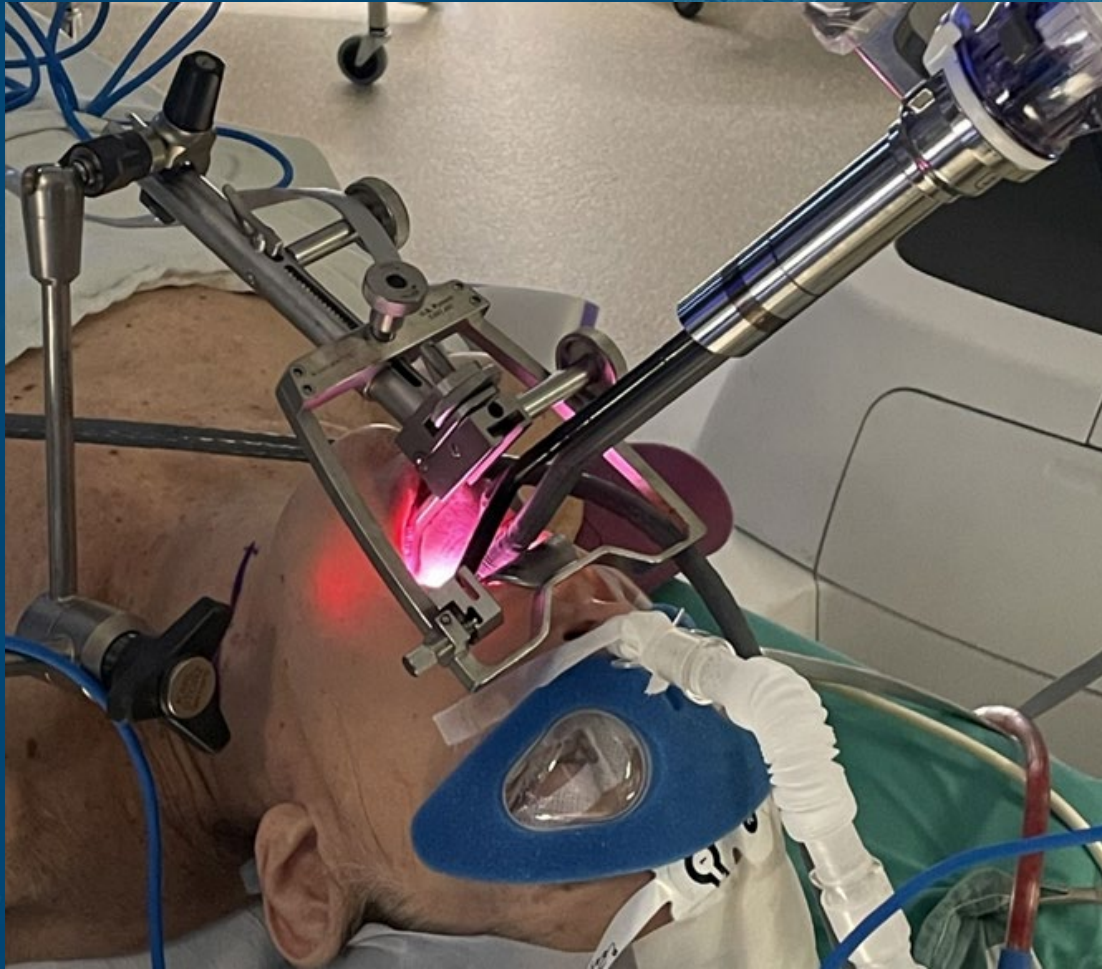
Case Series



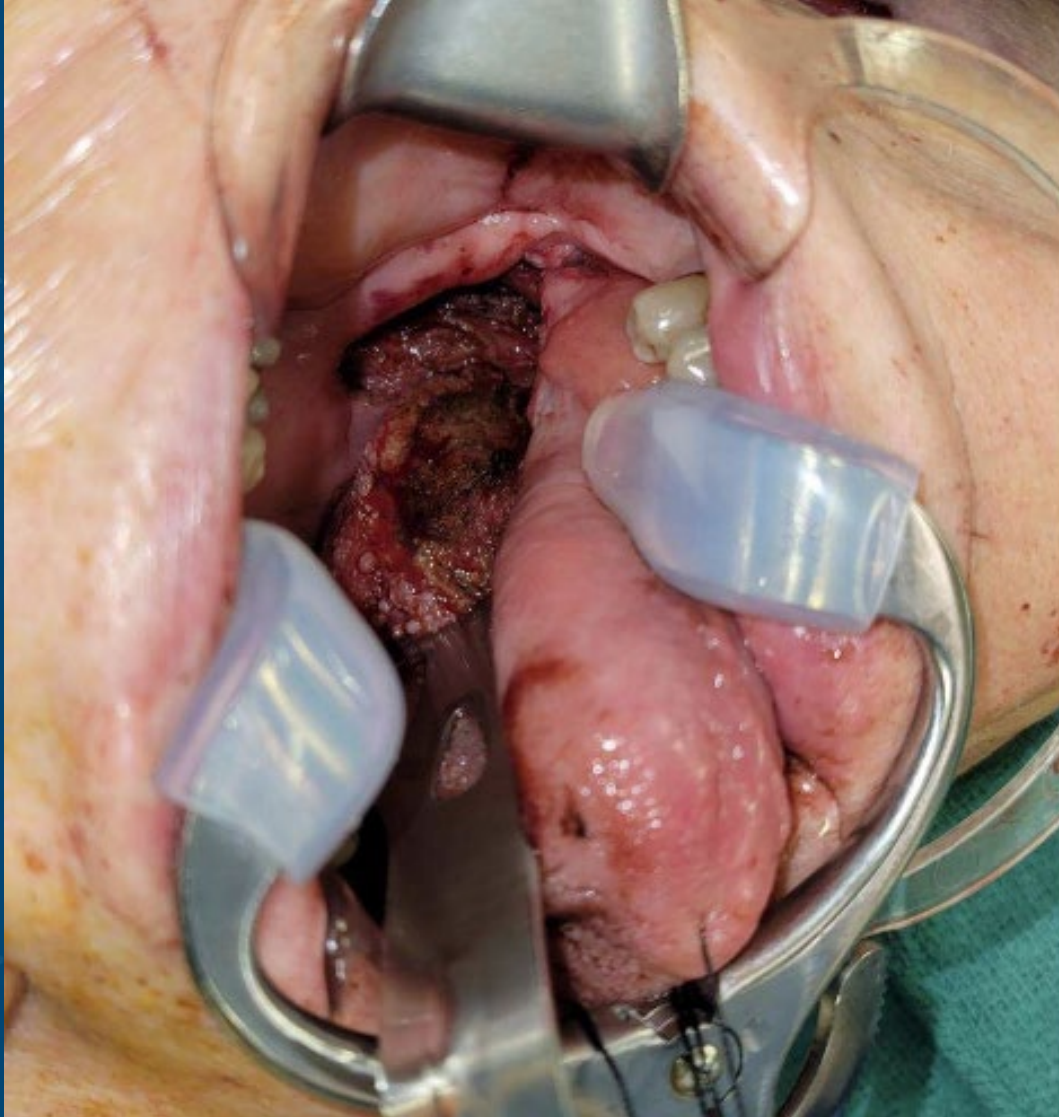
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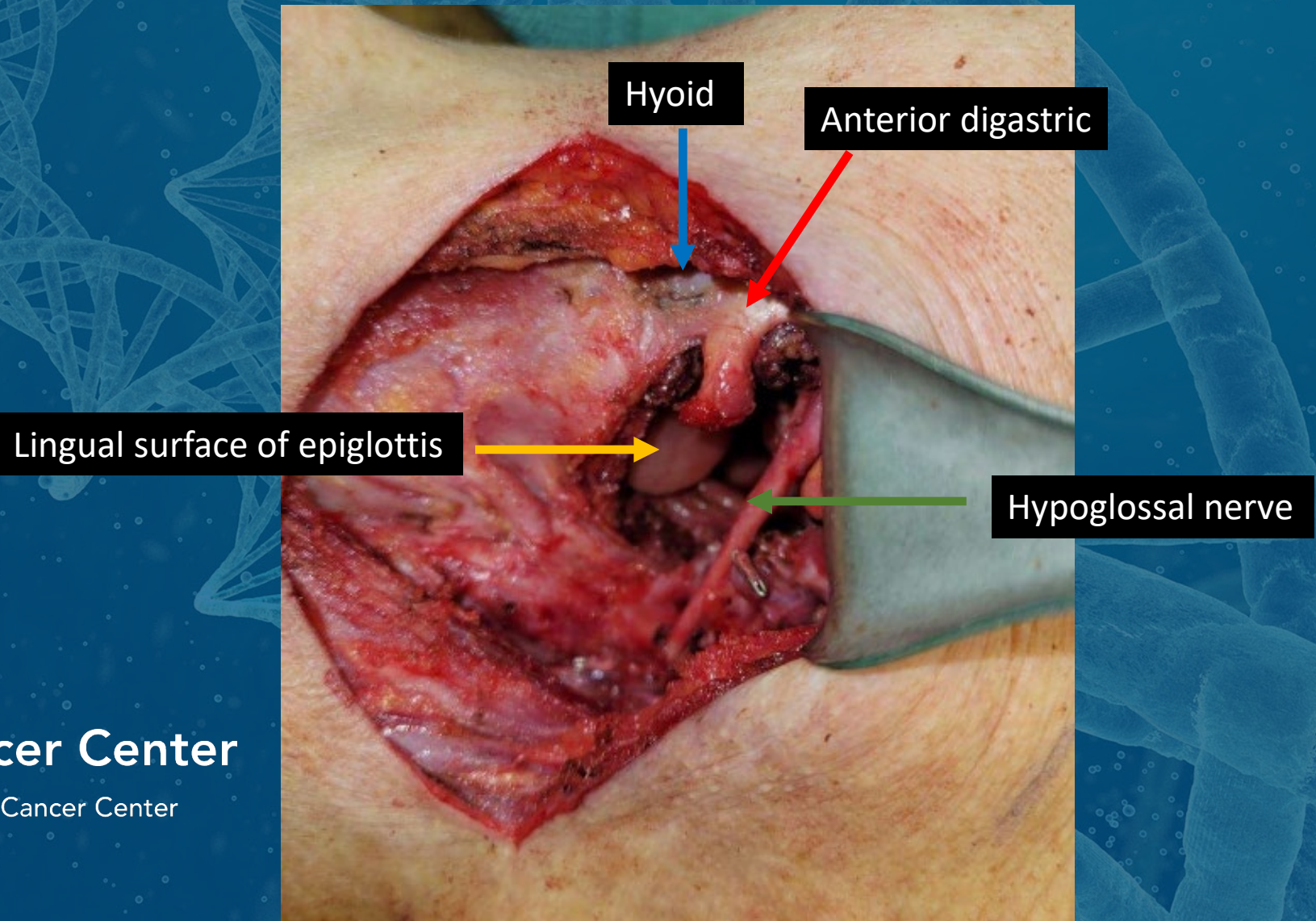
TORS-assisted salvage oropharyngectomy



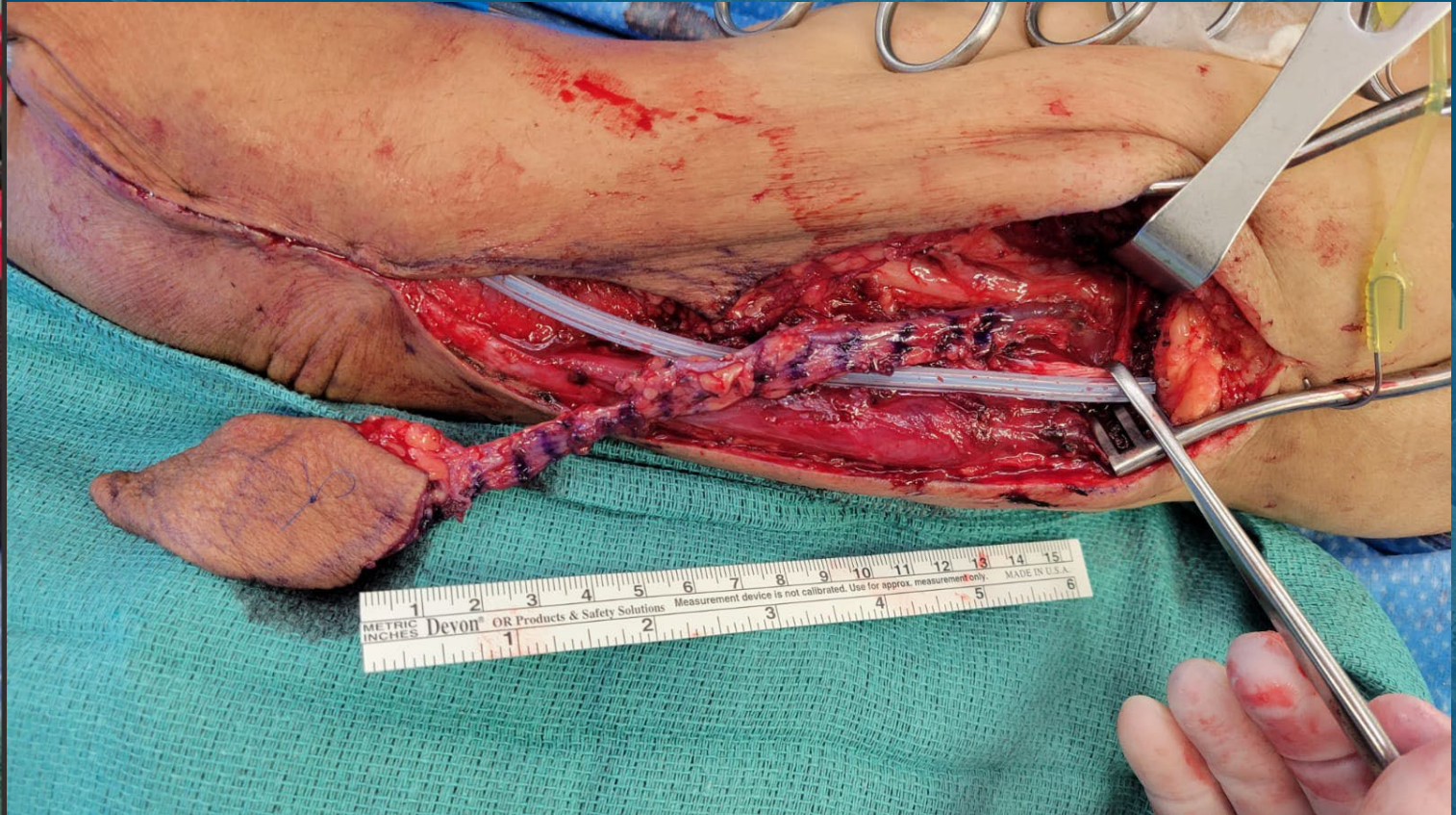
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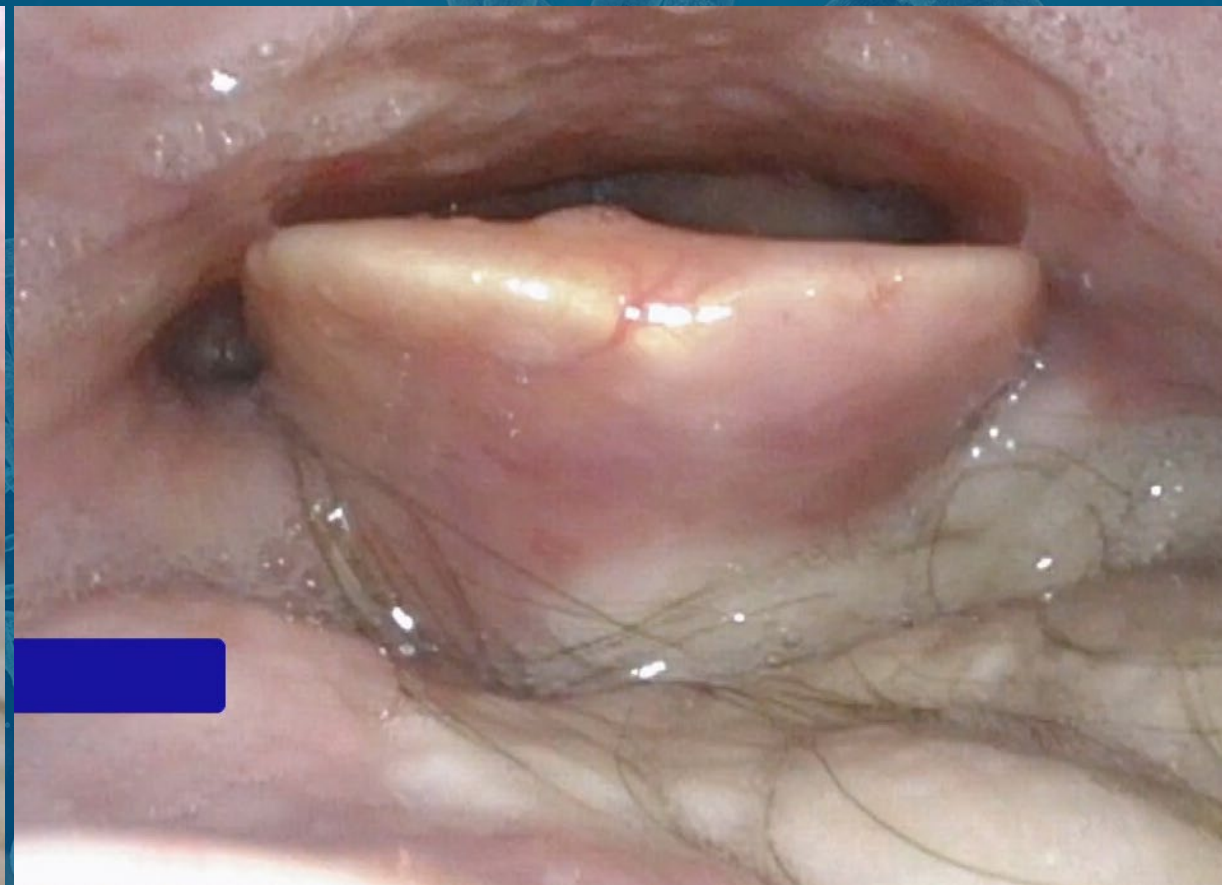
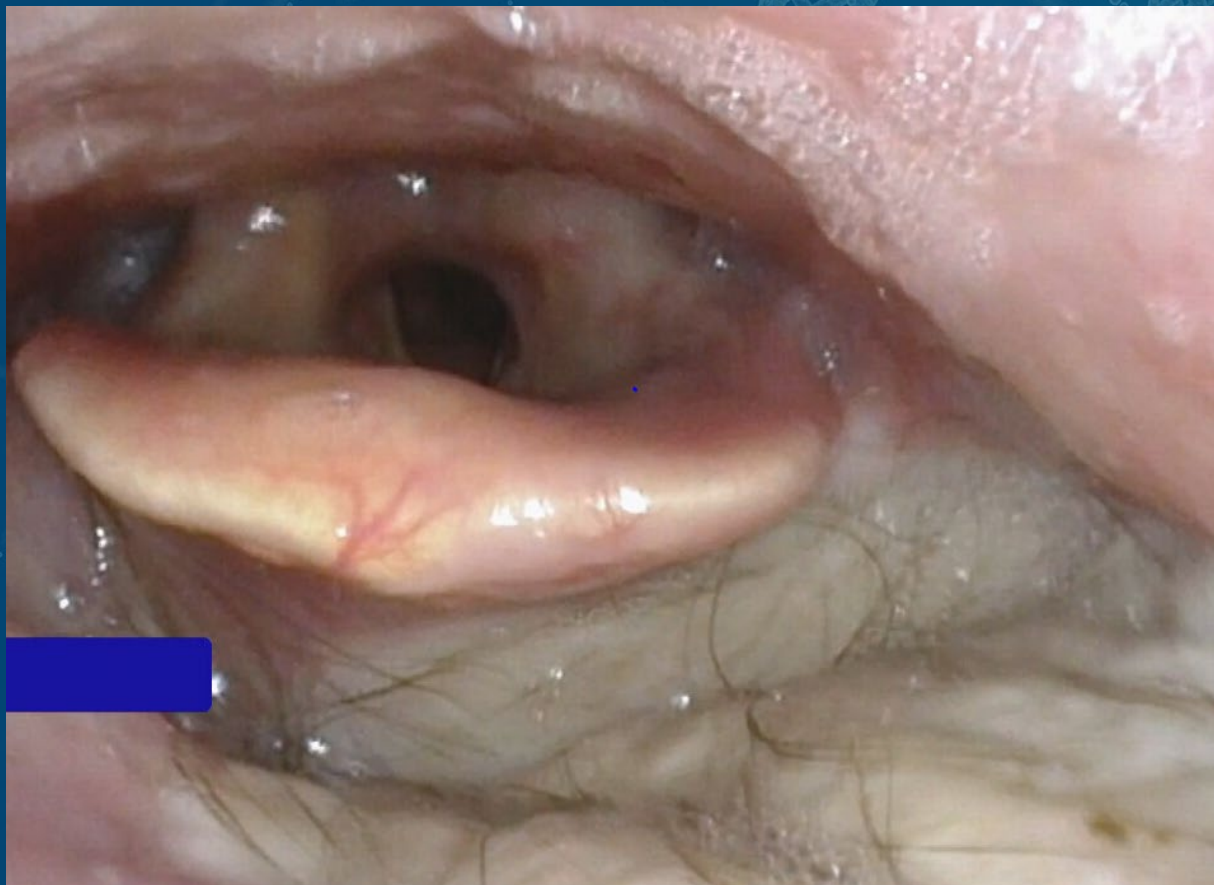
TORS-assisted salvage oropharyngectomy



TORS-assisted salvage oropharyngectomy



TORS-assisted salvage oropharyngectomy



But does the extra time and resources required for TORS-assisted surgery make a difference?



Methods

- Retrospective review of all patients who underwent TORS assisted oropharyngectomy with free flap reconstruction from 01/2012 to 03/2015
- and subsequent secondary review using same inclusion criteria of a prospective registry data from the MD Anderson Oropharynx Cancer Registry Patient-Reported and Functional Core from 04/2015 to 07/2023
- Reviewed descriptive variables including patient demographics, tumor characteristics and staging (AJCC 8th Ed), operative details, complications, and functional outcomes.
- Retrospectively reviewed patient reported outcomes:
 - MD Anderson Dysphagia Inventory (MDADI)
 - Performance Scale for Head and Neck Cancer Patients (PSS-HN)

Age in years at time of surgery, mean (SD)	63.9 (10.4)	Pathology	
Sex		Squamous Cell Carcinoma	41 (87.2)
Female (%)	5 (10.6)	Other	6 (12.8)
Male (%)	42 (89.4)	Persistent/Recurrent Tumor	
Tobacco use status		Yes	37 (78.7)
Never (%)	17 (36.2)	No	10 (21.3)
Former (%)	23 (48.4)	Previous Radiation Therapy	
Current (%)	7 (14.9)	Yes	39 (83)
Comorbidity requiring chronic medication		No	8 (17)
Yes (%)	31 (66)	Previous Systemic Therapy	
No (%)	16 (34)	Yes	36 (76.6)
Primary tumor site		No	11 (23.4)
Tonsil (%)	15 (31.9)	Neoadjuvant Systemic Therapy	
Base of tongue (%)	26 (55.3)	Yes	23 (48.9)
Other oropharynx (%)	5 (10.6)	No	24 (51.1)
Other (%)	1 (2.1)		
Clinical T Stage (AJCC Staging Manual, 8 th Ed.)			
1	18 (39.1)		
2	21 (45.7)		
3	4 (8.7)		
4	3 (6.5)		
Clinical N Stage (AJCC Staging Manual, 8 th Ed.)			
0	32 (69.6)		
1	7 (15.2)		
2	6 (13.0)		
3	1 (2.2)		

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No	11 (23.4)
Neoadjuvant Systemic Therapy	
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No	24 (51.1)

-47 patients included

-89% male

-48% former smokers

-84.8% cT1 and cT2 tumors

-87.2% SCC, others included mucoepidermoid carcinoma and adenoid cystic carcinoma

-83% previously treated with XRT

-49% treated with neoadjuvant systemic therapy

Characteristic	All patients (n= 47)
Extent of Resection	
Pharyngectomy alone (%)	31 (67)
Pharyngectomy with partial glossectomy (%)	14 (29.8)
Pharyngectomy with partial laryngectomy (%)	3 (6.4)
Tumor specimen volume, cm ³ (SD)	34.4 (39.4)
Neck Dissection	
None (%)	5 (10.6)
Ipsilateral (%)	38 (80.9)
Bilateral (%)	4 (8.5)
Flap Type	
Thigh-based flap (%)	22 (46.8)
Forearm-based flap (%)	16 (34.0)
Lateral arm flap (%)	6 (12.8)
Other (%)	3 (6.4)
Recipient Artery	
Facial (%)	24 (51.1)
Superior Thyroid (%)	15 (31.9)
Lingual (%)	4 (8.5)
Transverse Cervical (%)	3 (6.4)
External carotid (%)	1 (2.1)
Recipient Vein	
Facial (%)	20 (42.6)
Other branch of internal jugular vein (%)	19 (40.4)
External jugular vein (%)	6 (12.8)
Transverse cervical vein (%)	2 (4.3)
Tracheostomy	
Yes (%)	47 (100)
No (%)	0 (0)
Enteral Access	
Percutaneous endoscopic gastrostomy tube (%)	31 (66.0)
Previous feeding tube placed (%)	8 (17.0)
Feeding tube placed post-op (%)	5 (10.6)
Nasogastric feeding tube (%)	3 (6.4)

-81% unilateral neck dissection

-Other flaps included SCIP, MSAP, and PAP

-83% used facial artery or superior thyroid artery as recipient

-All patients receive tracheostomy

-93.6% already had, or received gastrostomy tube in perioperative period

Characteristic	All patients (n= 47)
Total Complications	11 (23.4)
Flap Complications	
Partial flap failure (%)	1 (2.1)
Total flap failure (%)	0 (0)
Return to OR for flap compromise (%)	0 (0)
Bleeding (requiring return to OR) (%)	2 (4.3)
Airway emergency (%)	0 (0)
Medical complication requiring readmission (%)	8 (17.0)

- Overall, 23.4% complication rate
- Low rate of flap failure
- Medical complications included pneumonia, myocardial infarction, failure to thrive

Characteristic	All patients (n= 47)
Length of hospital stay, days, mean (SD)	8.0 (5.2)
Trach dependence at last follow up	
Yes (%)	7 (14.9)
No (%)	40 (85.1)
Days to first MBS (SD)	28.7 (13.4)
Days to first oral intake (SD)	36.4 (32.6)
Aspiration on first MBS	
Yes (%)	19 (40.4)
No	28 (59.6)
Anastomotic leak on first MBS	
Yes (%)	5 (10.6)
No (%)	42 (89.4)
Days to feeding tube removal, mean (SD)	102.1 (71.6)
Feeding tube removed at last follow up	
Yes (%)	22 (50.0)
No (%)	22 (50.0)

-Short hospital stay on average

-85% of patients are able to be decannulated

-High rate of early aspiration on MBS

-Low rate of leak

-50% of patients with long term feeding tube

MDADI: MD Anderson Dysphagia Inventory

Validated, self administered 20-item
measure of swallowing-related quality of
life ranging from 20 (worst) to 100 (best)

Composite score change in >10 is widely
regarded as clinically relevant significant
difference

M. D. Anderson Dysphagia Inventory

This questionnaire asks for your views about your swallowing ability. This information will help us understand how you feel about swallowing. The following statements have been made by people who have problems with their swallowing. Some of the statements may apply to you.

Please read each statement and circle the response which best reflects your experience in the past week.

1 = Strongly agree 2 = Agree 3= No Opinion 4= Disagree 5= Strongly Disagree

- (1) My swallowing ability limits my day-to-day activities.....0 1 2 3 4 5
- (2) I am embarrassed by my eating habits.....0 1 2 3 4 5
- (3) People have difficulty cooking for me.....0 1 2 3 4 5
- (4) Swallowing is more difficult at the end of the day.....0 1 2 3 4 5
- (5) I do not feel self-conscious when I eat.....0 1 2 3 4 5
- (6) I am upset by my swallowing problem.....0 1 2 3 4 5
- (7) Swallowing takes great effort.....0 1 2 3 4 5
- (8) I do not go out because of my swallowing problem.....0 1 2 3 4 5
- (9) My swallowing difficulty has caused me to lose income.....0 1 2 3 4 5
- (10) It takes me longer to eat because of my swallowing problem.....0 1 2 3 4 5
- (11) People ask me, "Why can't you eat that?".....0 1 2 3 4 5
- (12) Other people are irritated by my swallowing problem.....0 1 2 3 4 5
- (13) I cough when I try to drink liquids.....0 1 2 3 4 5
- (14) My swallowing problems limit my social and personal life.....0 1 2 3 4 5
- (15) I feel free to go out to eat with my friends, neighbors and relatives.....0 1 2 3 4 5
- (16) I limit my food intake because of my swallowing difficulty.....0 1 2 3 4 5
- (17) I cannot maintain my weight because of my swallowing problem.....0 1 2 3 4 5
- (18) I have low self-esteem because of my swallowing problem.....0 1 2 3 4 5
- (19) I feel that I am swallowing a huge amount of food.....0 1 2 3 4 5
- (20) I feel excluded because of my eating habits.....0 1 2 3 4 5

PSS-HN: Performance Status Scale for Head and Neck Cancer Patients

PERFORMANCE STATUS SCALE FOR
HEAD AND NECK CANCER PATIENTS: PSS-HN

Patient Name _____ ID# /_/_/_/_/_/_/_/_/_/_ Date /_/_/_/_/_/_/_/_/_/_

Significant predictor of quality of life

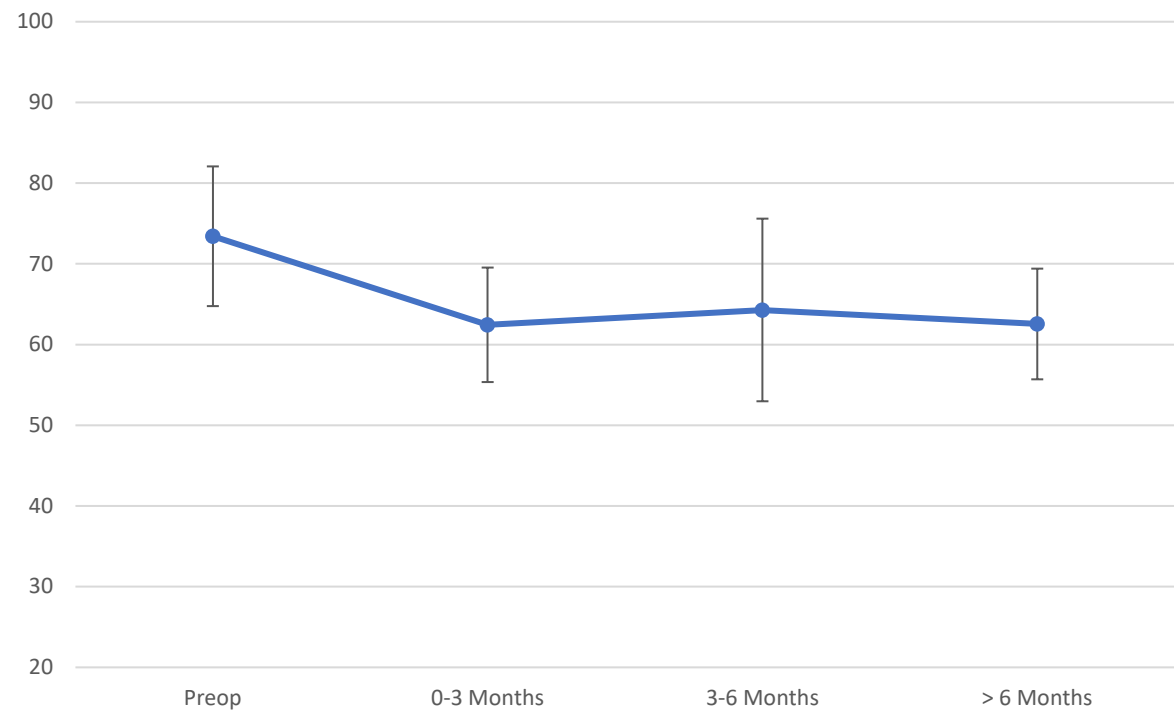
Easy to interpret and administer

Score of 0 = completely tube feed dependent

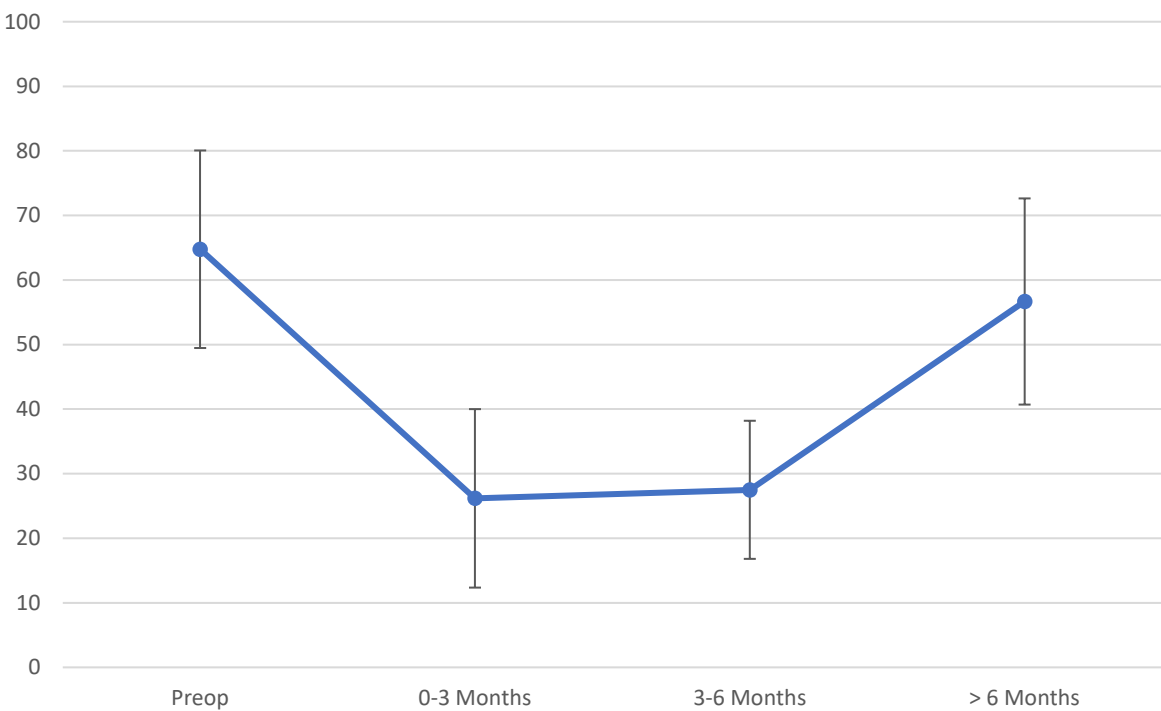
NORMALCY OF DIET /_/_/_/_/		PUBLIC EATING /_/_/_/_/	
100	Full diet (no restrictions)	100	No restriction of place, food or companion (eats out at any opportunity)
90	Full diet (liquid assist)	75	No restriction of place, but restricts diet when in public (eats anywhere, but may limit intake to less "messy" foods (e.g., liquids)
80	All meat	50	Eats only in presence of selected persons in selected places
70	Raw carrots, celery	25	Eats only at home in presence of selected persons
60	Dry bread and crackers	0	Always eats alone
50	Soft chewable foods (e.g., macaroni, canned/soft fruits, cooked vegetables, fish, hamburger, small pieces of meat)	999	Inpatient
40	Soft foods requiring no chewing (e.g., mashed potatoes, apple sauce, pudding)	UNDERSTANDABILITY OF SPEECH /_/_/_/_/	
30	Pureed foods (in blender)	100	Always understandable
20	Warm liquids	75	Understandable most of the time; occasional repetition necessary
10	Cold liquids	50	Usually understandable; face-to-face contact necessary
0	Non-oral feeding (tube fed)	25	Difficult to understand
		0	Never understandable; may use written communication

List MA, Ritter-Sterr C, Lansky SB. A Performance Status Scale for Head and Neck Cancer Patients. Cancer. 66:564-569, 1990

Patient reported outcomes



Mean MDADI composite score preoperatively, then at 0-3 months, 3-6 months, and > 6 months post operatively following salvage oropharyngectomy with free flap reconstruction. Error bars show standard deviation.



Mean PSS-HN normalcy of diet scores preoperatively, then at 0-3 months, 3-6 months, and > 6 months post operatively following salvage oropharyngectomy with free flap reconstruction. Error bars show standard deviation.

Future directions

Incorporate DIGEST score from preoperative and postoperative modified barium swallow data



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Review oncologic data for:

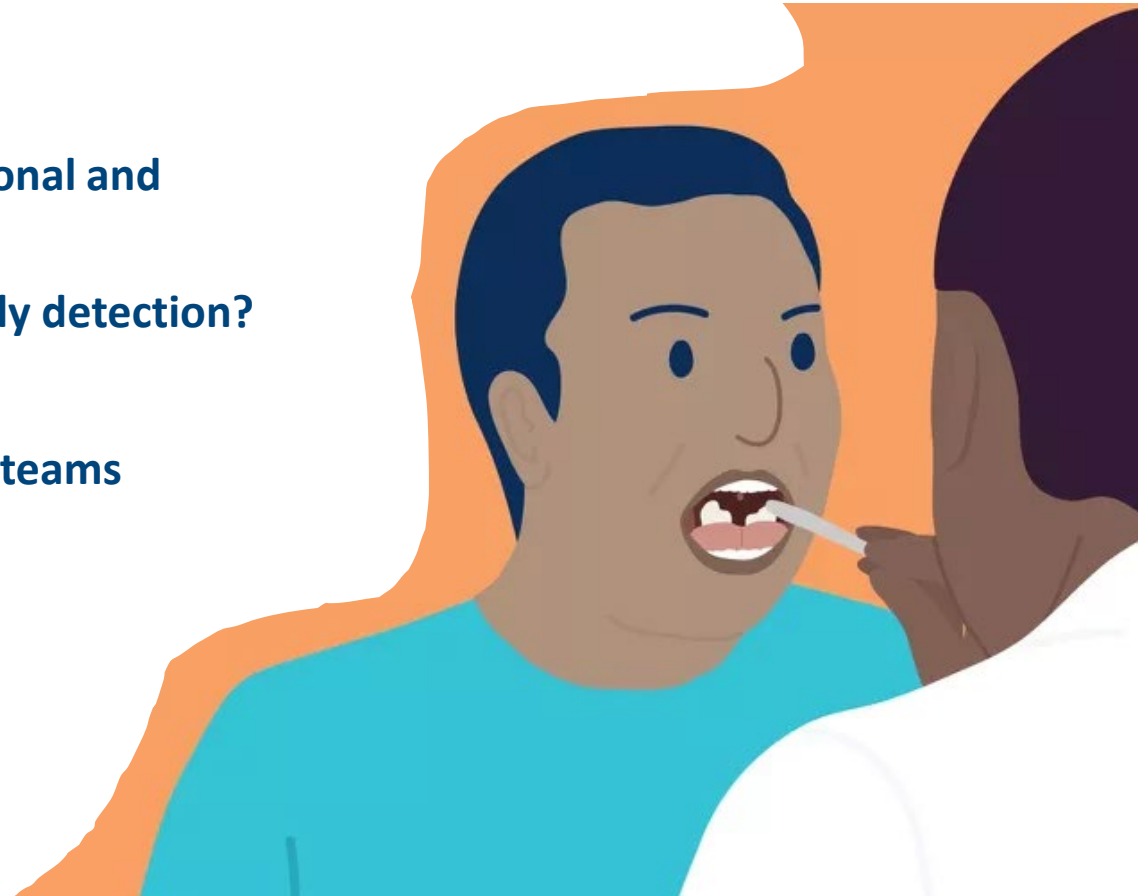
- Local regional and distant disease control
- Neoadjuvant chemo/immunotherapy as predictors of improved functional outcomes

Routine and frequent follow up

Early detection may play a role in improved functional and oncologic outcomes

Will ctDNA further aid in meaningful early detection?

Early and lifelong engagement with dedicated SLP teams



Through and thoughtful multidisciplinary team of experts is key



Careful patient selection and preoperative counseling paramount

Most patients are likely to need multidisciplinary treatment plans

These select group of patients should be considered for clinical trials

Despite the complex nature, complications in this cohort are low



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TORS assisted oropharyngectomy with free flap reconstruction is a safe and effective alternative to traditional open approaches

Thanks!

Z-Hye Lee, MD

Neil Gross, MD

Ryan Goepfert, MD

Peirong Yu, MD

Katherine Hutchenson, PhD

Carly Barbon, PhD

James Paget, MD PhD

Ariana Sahli, CCRP

Questions?



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Functional Outcomes After Robotic Assisted Salvage Surgery for Oropharyngeal Cancer

Michael Bobian, MD

Department of Otolaryngology – Head and Neck Surgery

Medical University of South Carolina

39th Annual F. Johnson Putney Lectureship in Head and Neck Cancer

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