The International Federation of Head and Neck Oncologic Societies

Current Concepts in Head and Neck Surgery and Oncology 2017

www.ifhnos.net

TORS

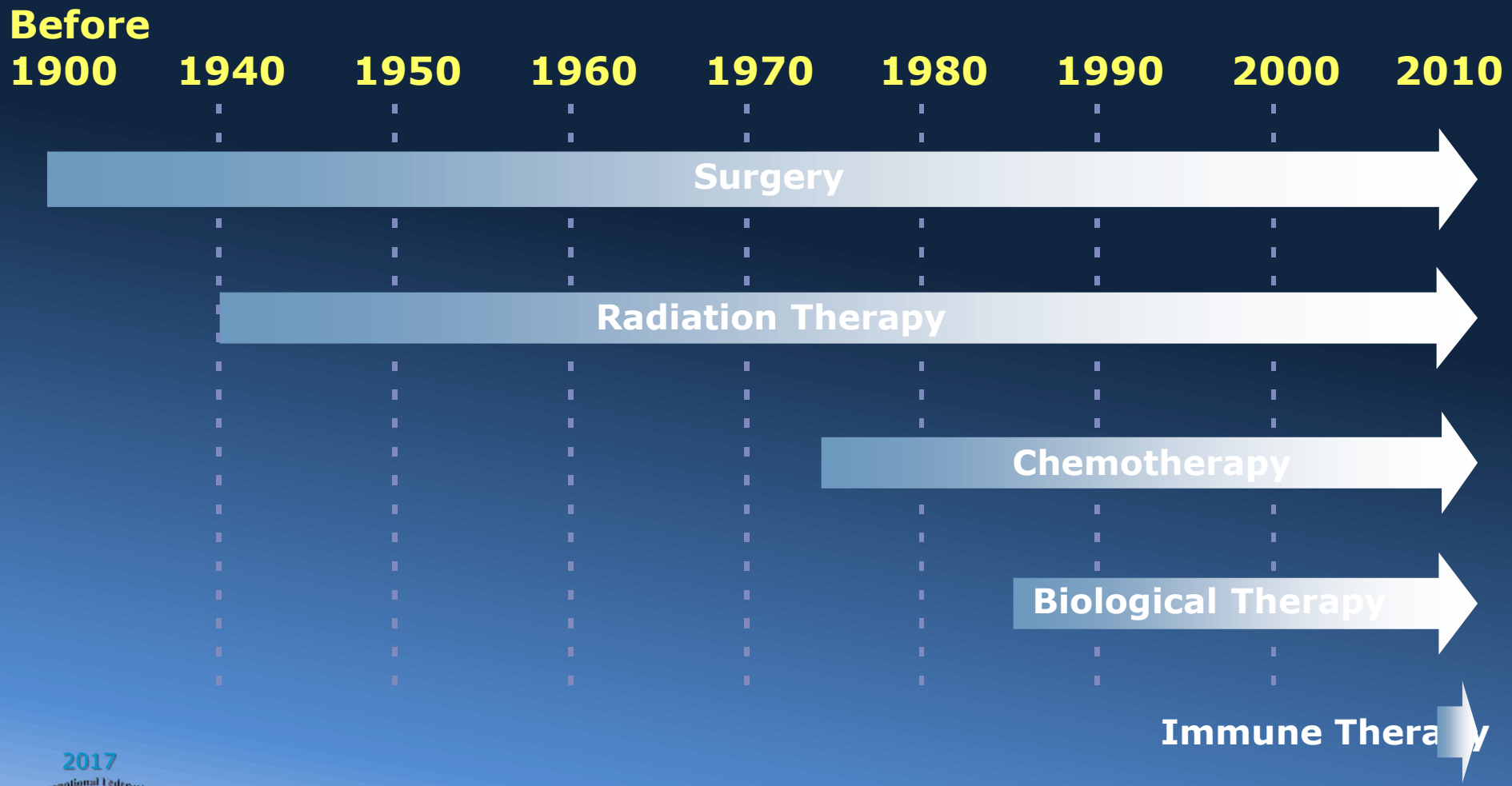
Ehab Hanna

Disclosures

- Intuitive Surgical
  - OHSU TORS Course 2010
  - Proctor 2011
  - Unpaid consultant, 2014-6
  - National Fellow's TORS Course 2015-6
  - Advanced TORS Course 2017
- MedRobotics
  - Unpaid consultant, 2014-6

Management of Head and Neck Cancer

Historical Perspective



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TransOral Robotic Surgery (TORS)

- What is it?
- Why do it?
- Which patients?
- How is it done?
- What are the risks?
- What are the outcomes?

TransOral Robotic Surgery (TORS)

What is it?

- Another instrument

2017

TransOral Robotic Surgery (TORS)

What is it?

- Another instrument
- Evolving technology

TransOral Robotic Surgery (TORS)

What is it?

TransOral Robotic Surgery (TORS)

Evolving Technology

Intuitive Surgical

TransOral Robotic Surgery (TORS)

Evolving Technology

Evolving Technology

MedRobotics

2017

TransOral Robotic Surgery (TORS)

What is it?

Another Instrument

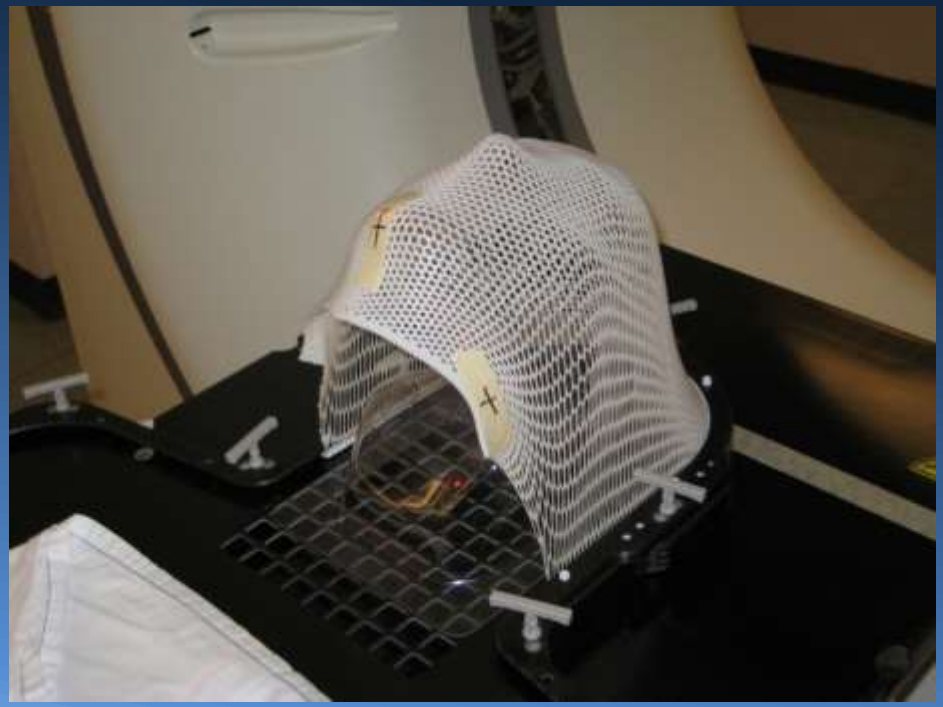
- Advantages
  - HD +/- 3-D visualization
  - Increased instrument degree of freedom
  - Increased precision

"smaller than my fingers"

TransOral Robotic Surgery (TORS)

What it isn't!

- Replacement of multidisciplinary management



TransOral Robotic Surgery (TORS)

- What is it?
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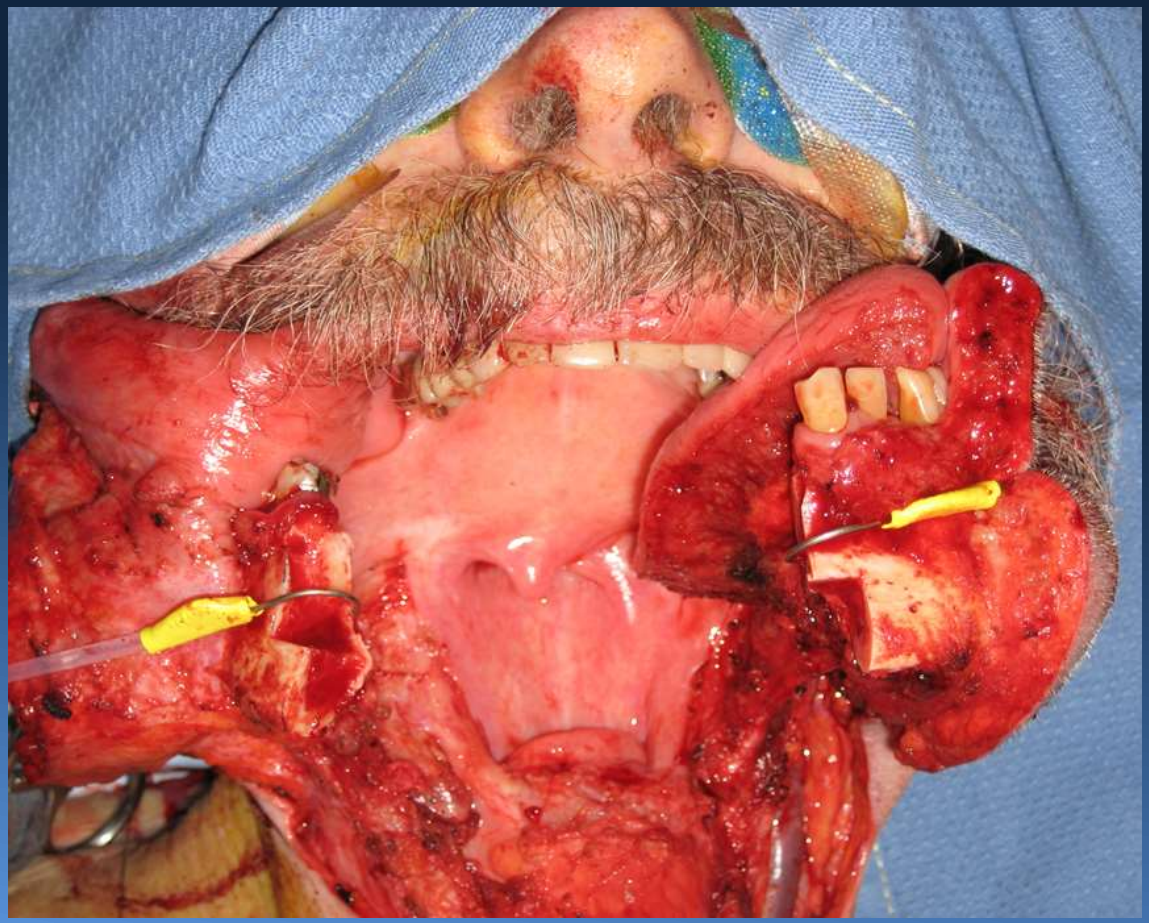
TransOral Robotic Surgery (TORS)

Why do it?



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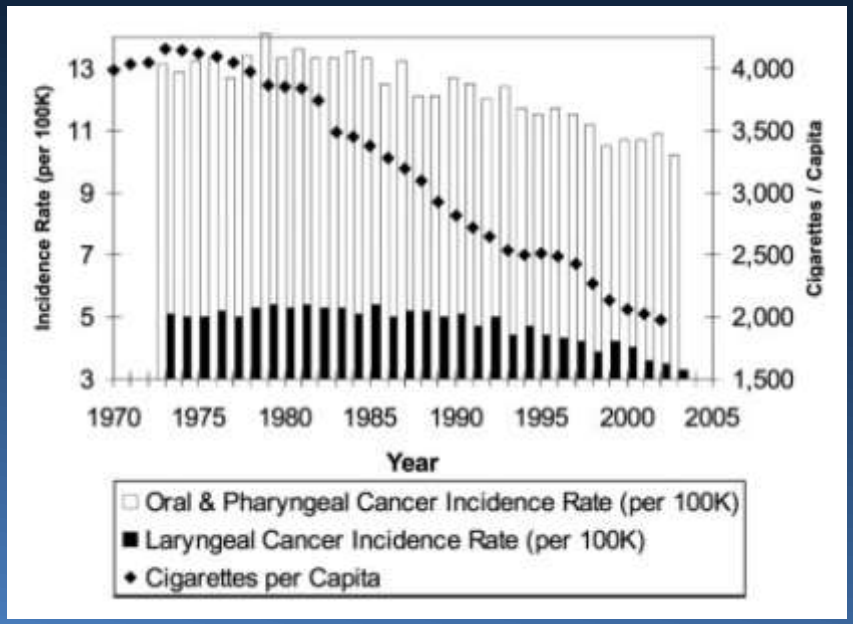
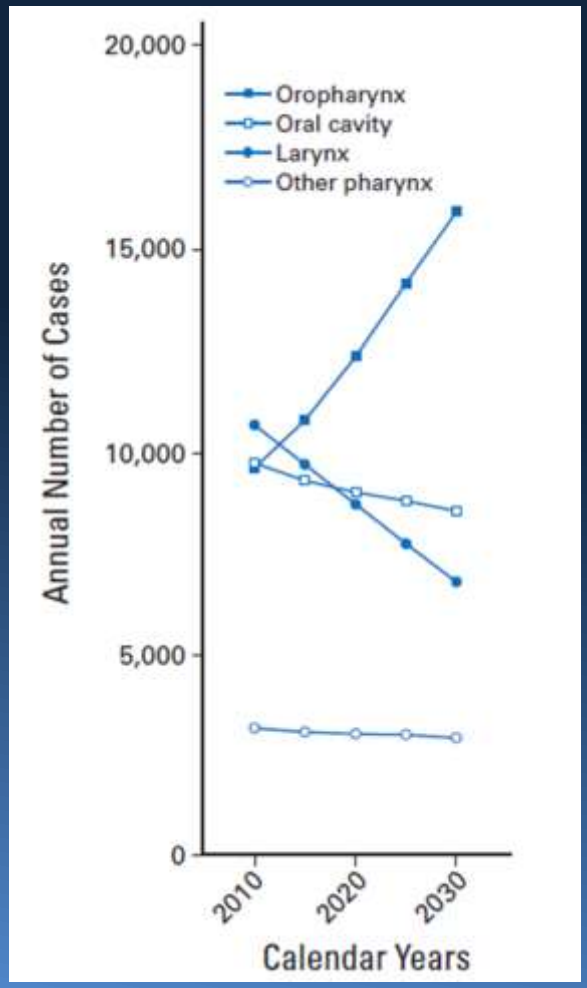
TransOral Robotic Surgery (TORS)

Why do it?



Sturgis E, Cinciripini P. *Cancer* 2007



Chaturvedi AK. *J Clin Oncol* 2011

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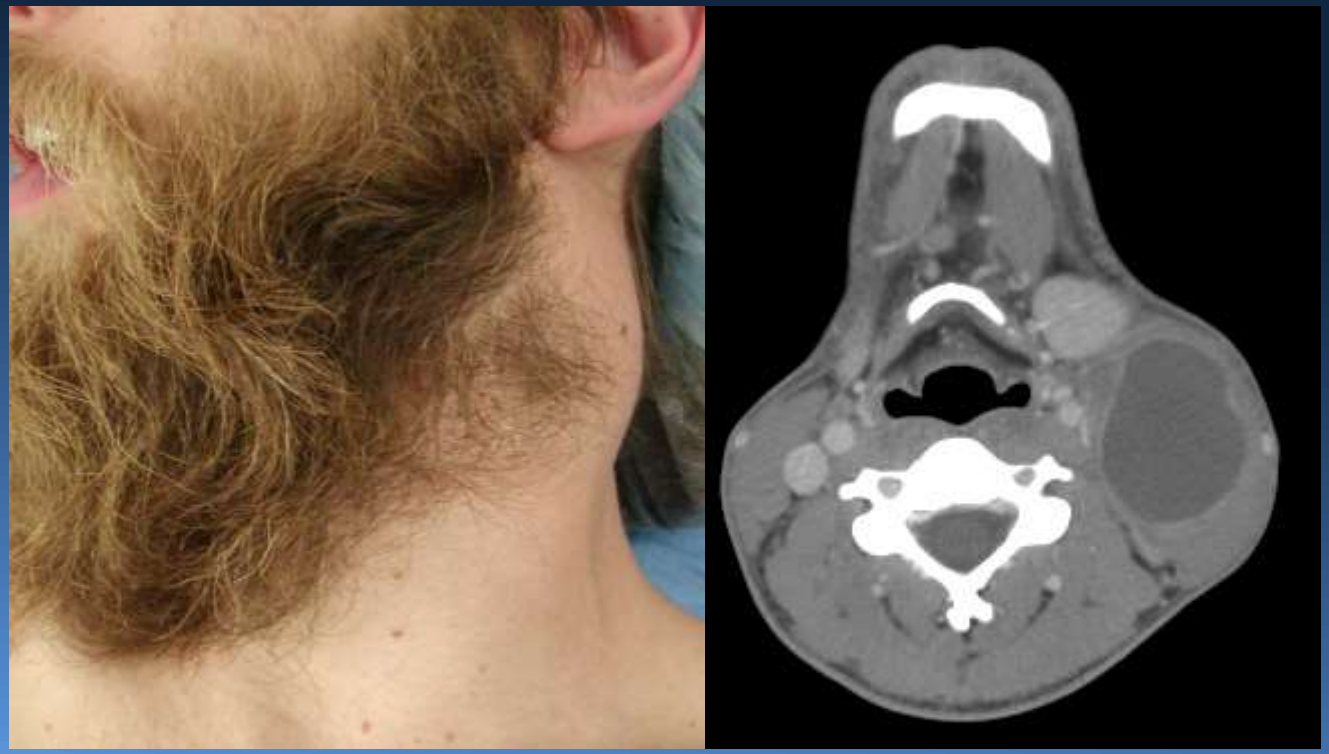
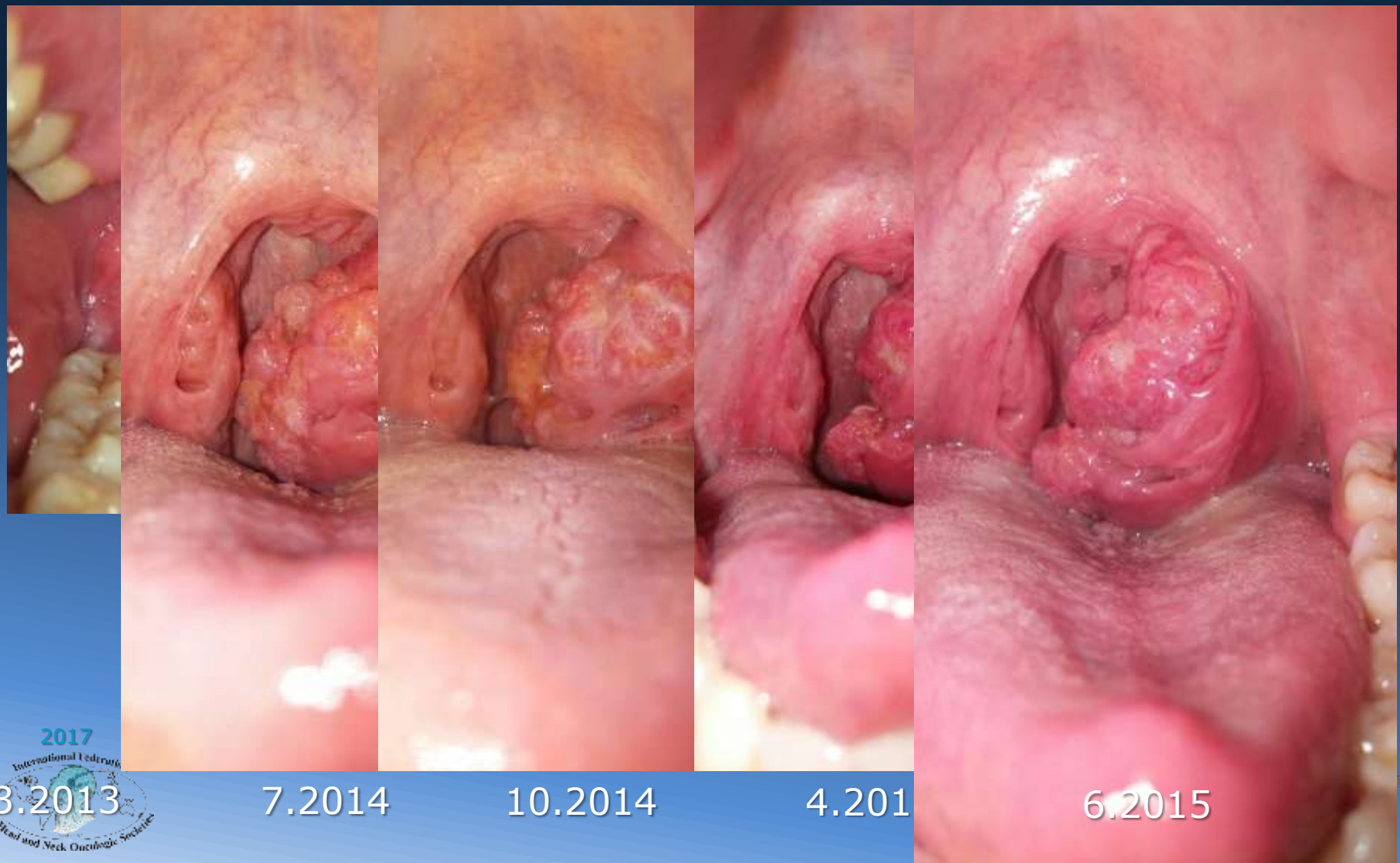
TransOral Robotic Surgery (TORS)
Why do it?

- A Different Disease



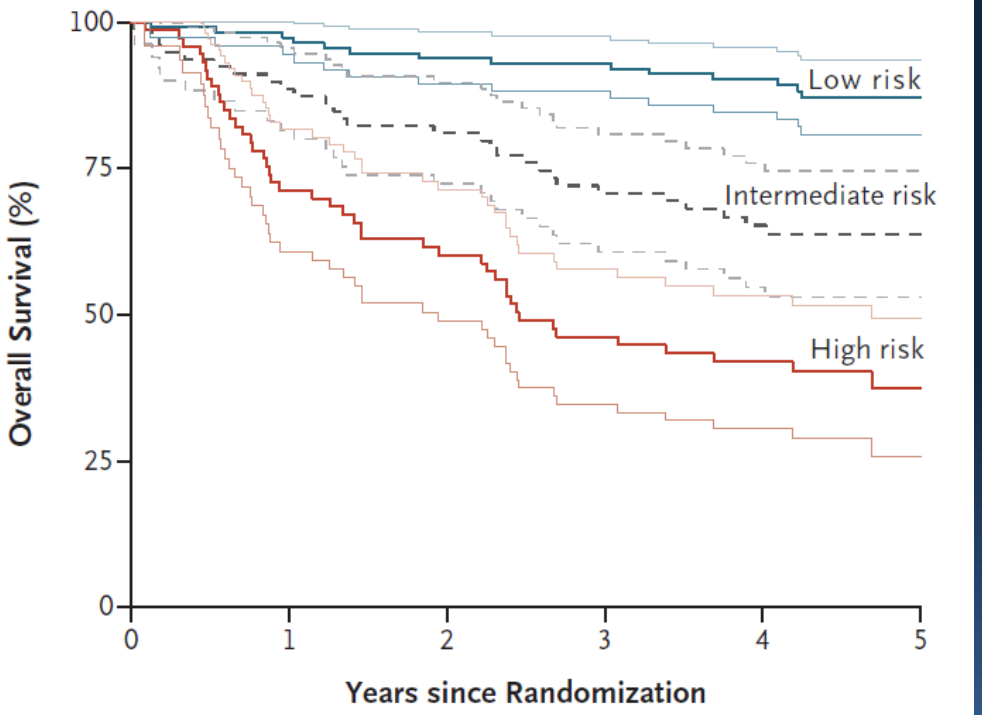
HPV-Associated Head & Neck Cancer

A Different Disease



HPV-Associated Head & Neck Cancer

Improved Survival



No. at Risk

Low risk	114	111	106	102	95	46
Intermediate risk	79	70	64	54	44	24
High risk	73	52	43	33	28	8

Ang K et al. *NEJM* 2010

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TransOral Robotic Surgery (TORS)
Why do it?

- Toxicity of radiation / chemoradiation
  - Xerostomia
  - Dysphagia
  - Esophageal stricture
  - Osteoradionecrosis
  - Hearing loss / neuropathy

TransOral Robotic Surgery (TORS)
Why do it?

- Dysphagia

  43% long-term grade 3/4 toxicity

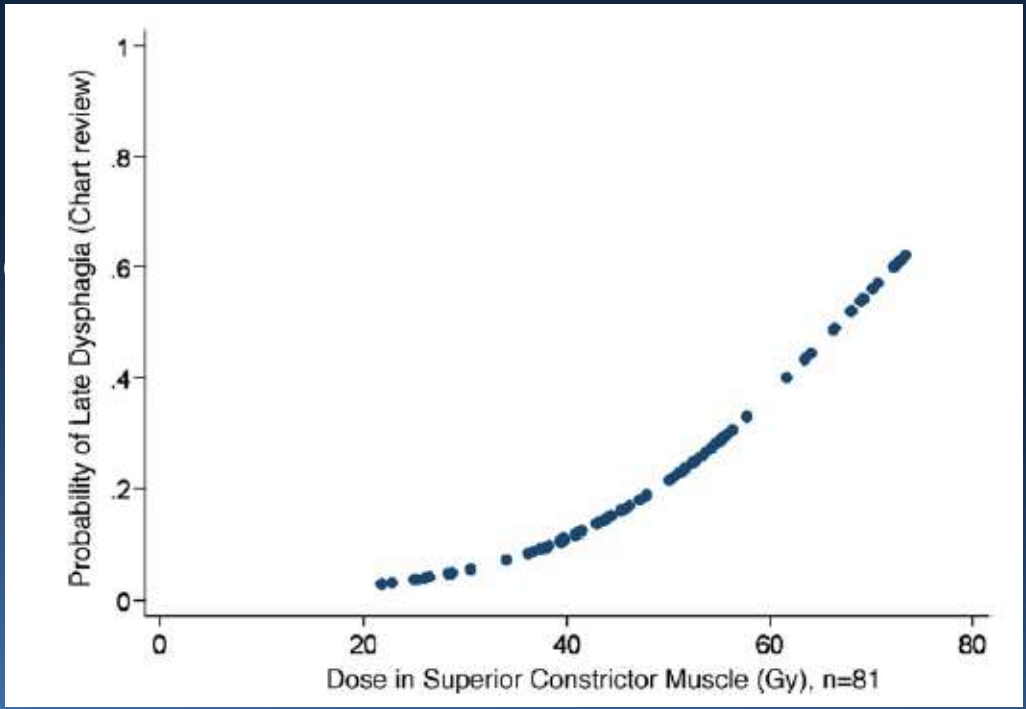
Variable	91-11	97-03	99-14	Total
Feeding tube dependence > 2 years post-radiation therapy	—*	29*		29
RTOG late toxicity criteria, grade 3+				
Pharyngeal dysfunction	16	28	19	63
Laryngeal dysfunction	22	6	0	28
Death	11	9	2	22
Other (eg, infection, fistula)	3	0	1	4
Any	38†	40†	21†	99†
No severe late toxicity event (controls)	50	62	19	13

Machtay M *et al*. *J Clin Oncol* 2008

TransOral Robotic Surgery (TORS)
Why do it?

- Quality of Life
  - Dysphagia

    Increased 19% p
    10Gy after 55Gy



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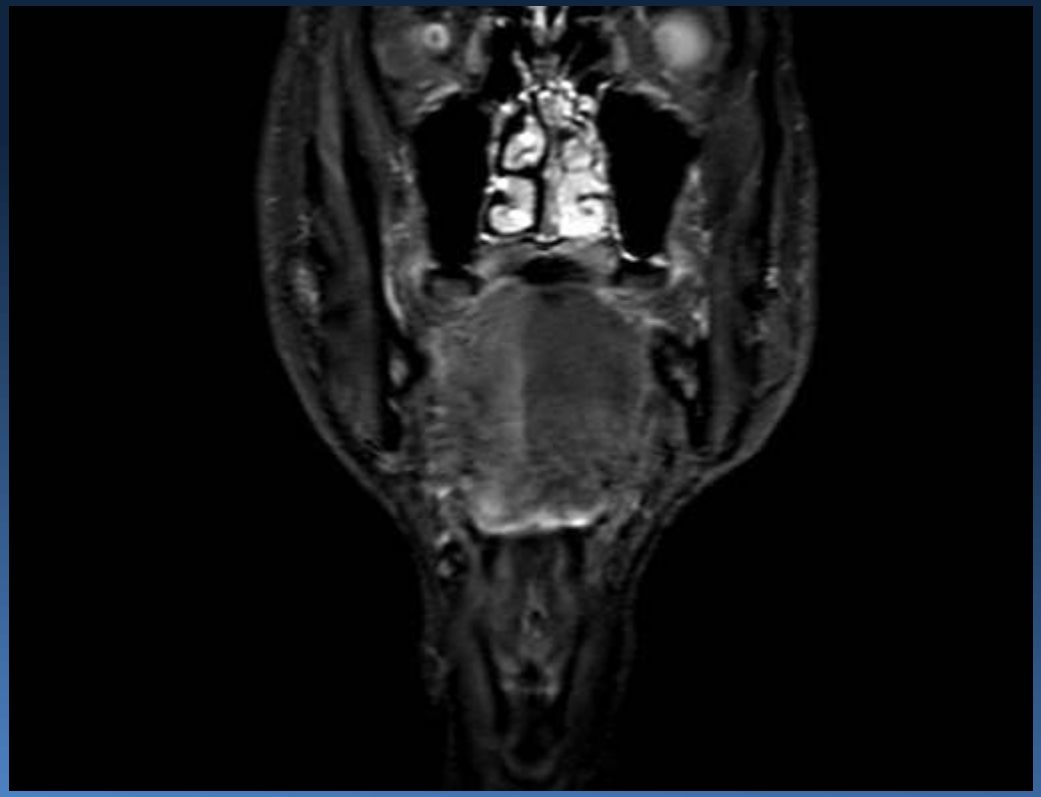
Levendag P *et al*. *IJROBP* 2006

TransOral Robotic Surgery (TORS)
Why do it?



Right tongue weakness/atrophy 6 years post concurrent chemoradiation

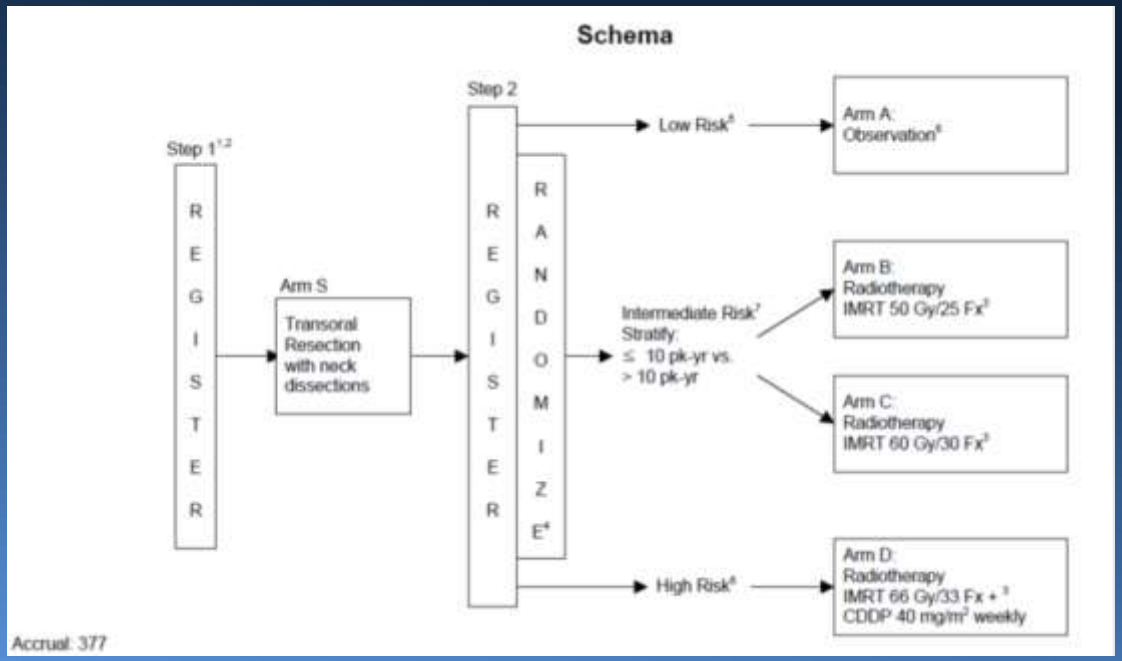
TransOral Robotic Surgery (TORS)

Why do it?

ECOG 3311

Randomized Phase II "De-intensification" Trial

p16+



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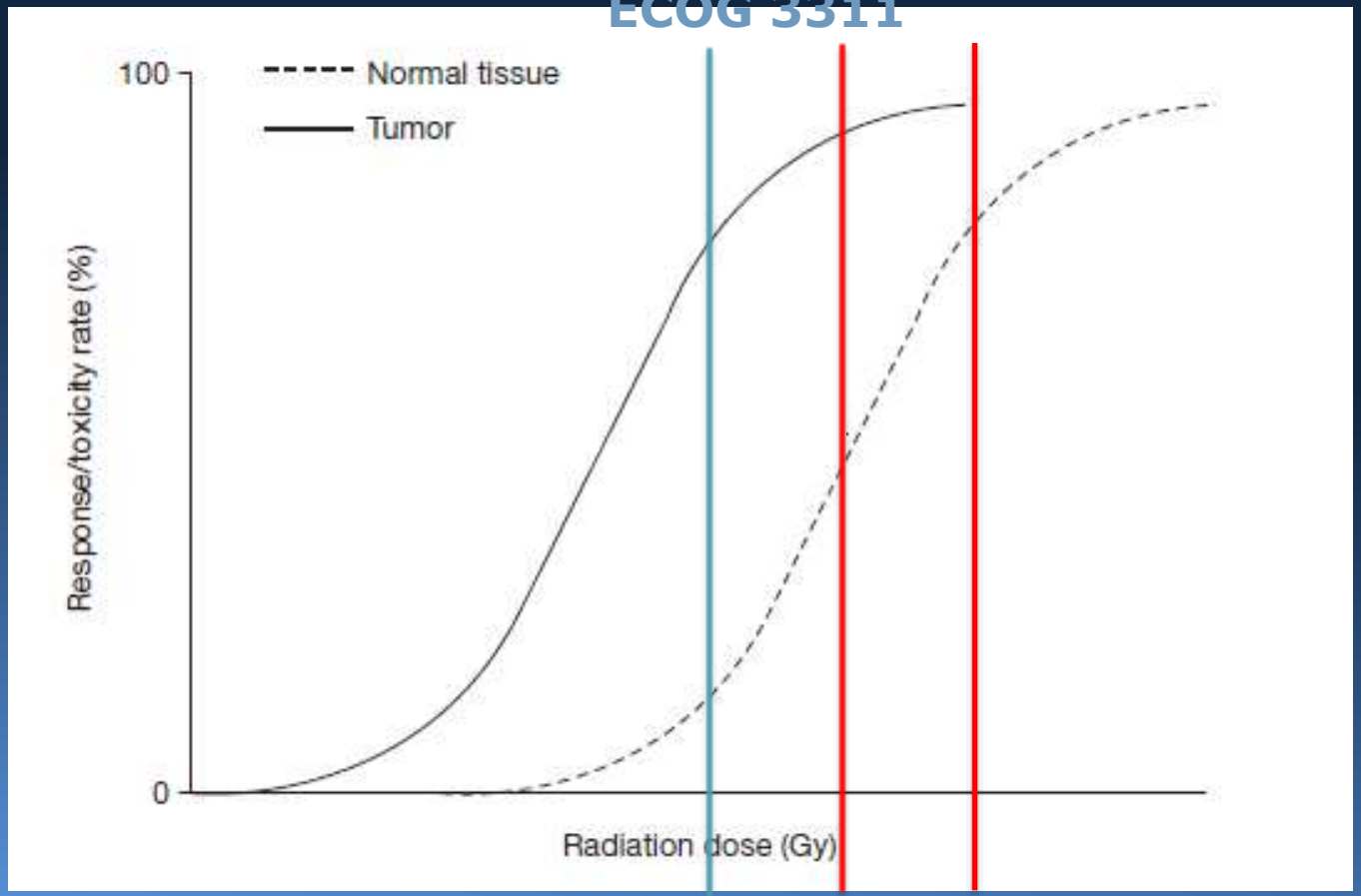
TransOral Robotic Surgery (TORS)

Why do it?



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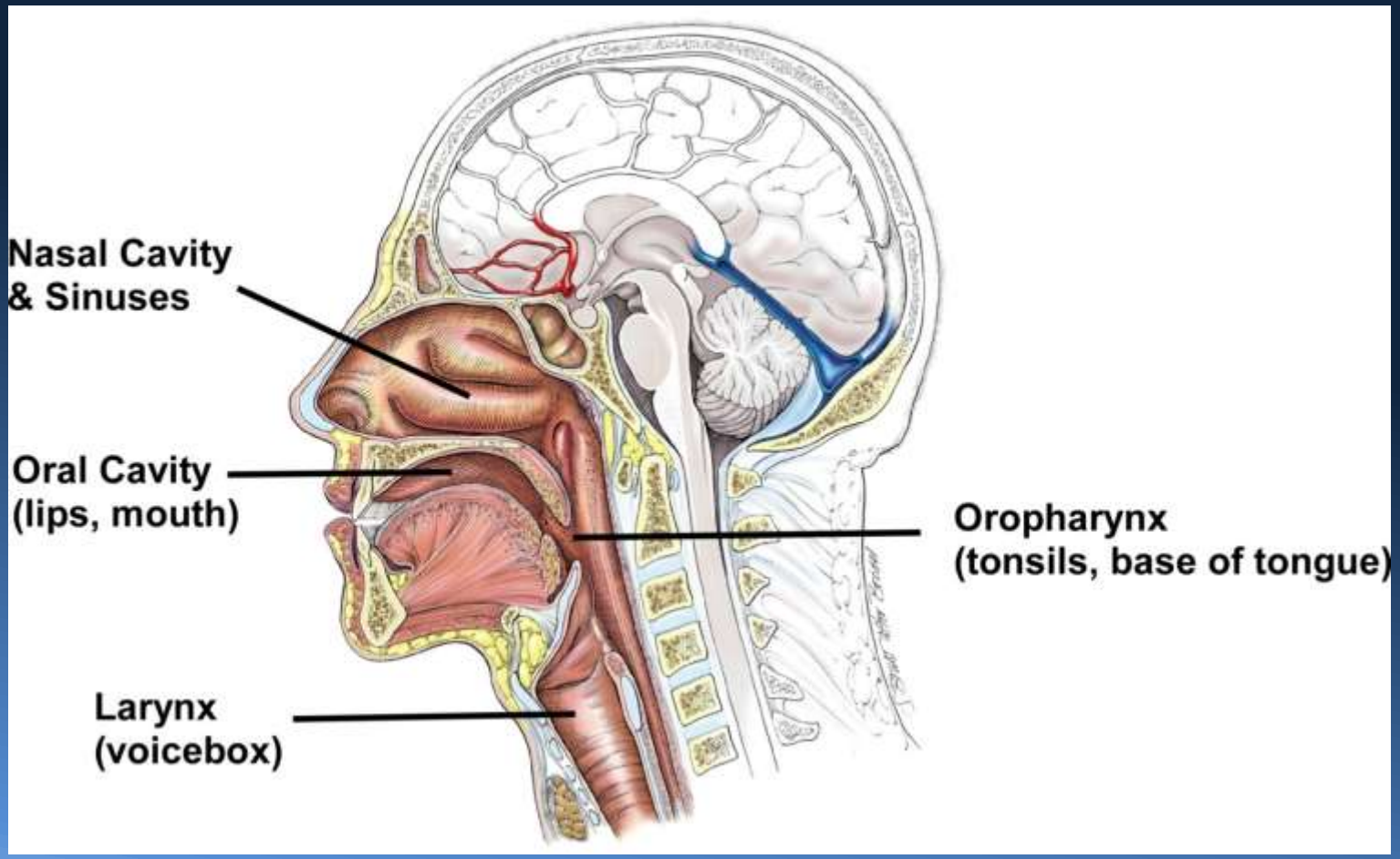
Perez and Brady's Principles and Practice of Radiation Oncology

TransOral Robotic Surgery (TORS)

Why NOT do it?



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TransOral Robotic Surgery (TORS)

- What is it?
- Why do it?
- Which patients?
- How is it done?
- What are the risks?
- What are the outcomes?

TransOral Robotic Surgery (TORS)
Which Patients?

- Patient factors
  - Obstructive dentition
  - Trismus
  - Kyphosis
- Tumor factors
  - Large size
  - Extent beyond midline
  - Location

T1-2*

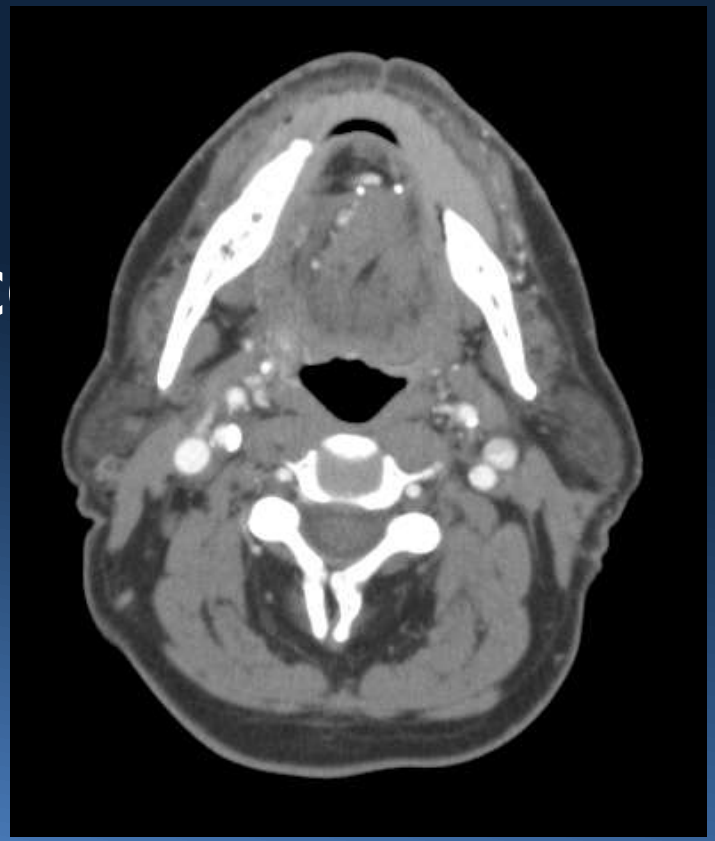
TransOral Robotic Surgery (TORS)
Which Patients?

- Multidisciplinary approach
- Goal
  - Tailor individual treatment(s) based on pathologic staging
    - **N1(2a?):** Avoid radiation
    - **N2b:** Avoid chemotherapy

TransOral Robotic Surgery (TORS)

Patient Selection

- 55yo Male
- Smoker
- Prior oral cavity canc
- New tonsil mass
- No adenopathy
- KPS 80



T1N0 SCC, p16-

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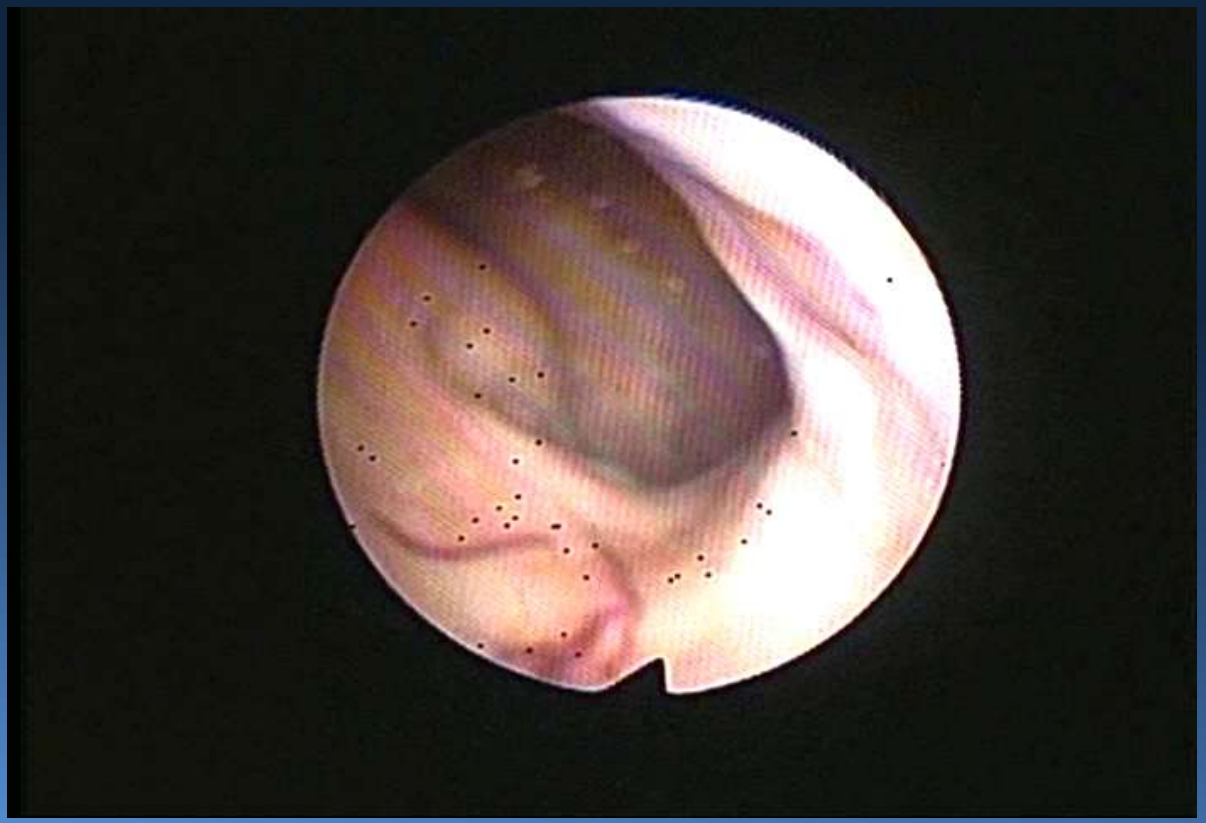
TransOral Robotic Surgery (TORS)

Patient Selection



T1N0 SCC, p16-

TransOral Robotic Surgery (TORS)
Patient Selection

- 45yo Male
- Nonmoker
- 2.5cm tonsil mas
- Single lymph noc
- KPS 100

T2N1 SCC, p16+

TransOral Robotic Surgery (TORS)

Patient Selection

T2N0 SCC, p16+

TransOral Robotic Surgery (TORS)

Patient Selection

T2N0 SCC, p16-

TransOral Robotic Surgery (TORS)

Patient Selection

T2N0 SCC, p16+

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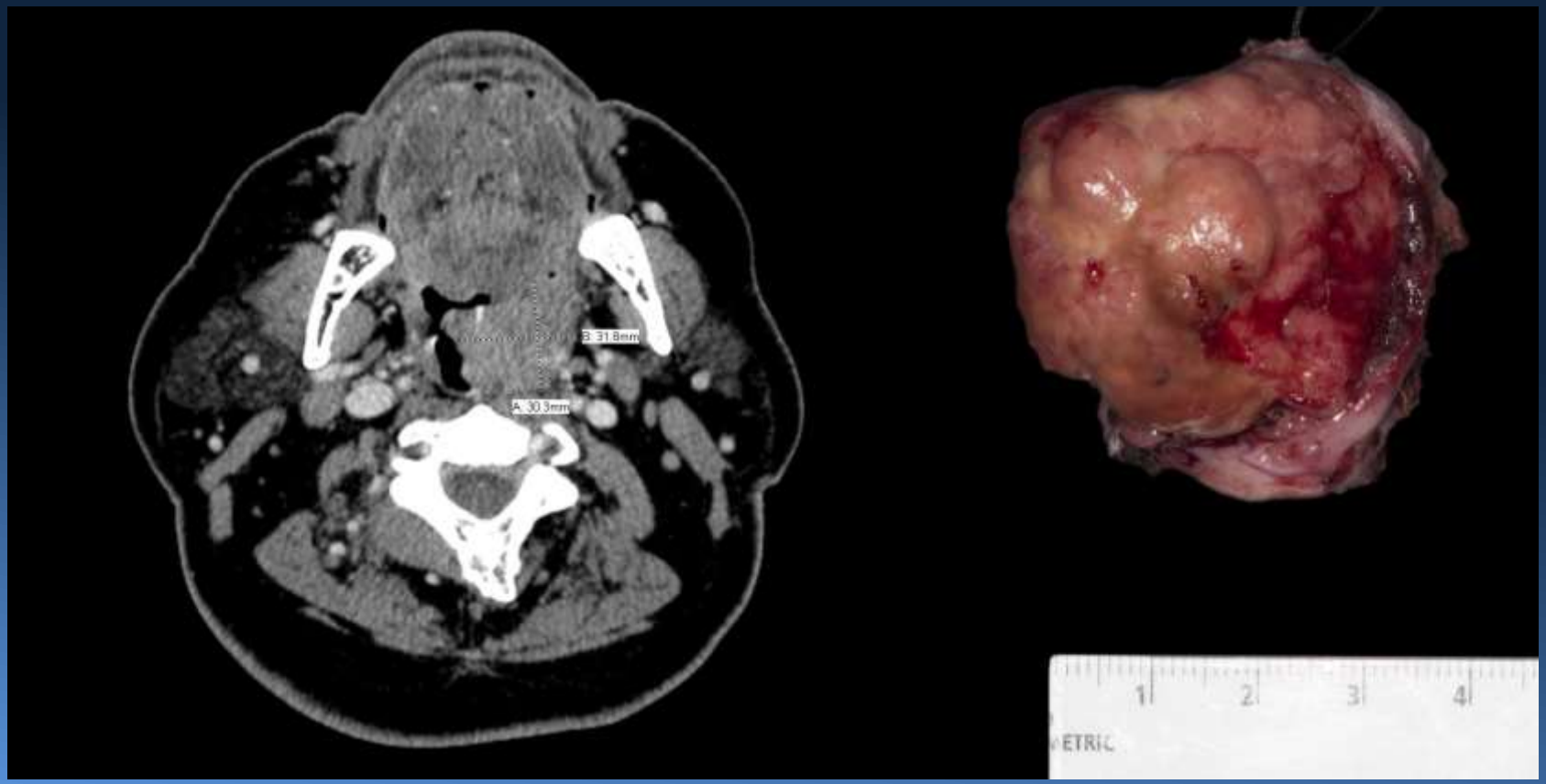
TransOral Robotic Surgery (TORS)

Patient Selection

T2N1 SCC, p16-

TransOral Robotic Surgery (TORS)

Patient Selection



T3N0 SCC, p16+

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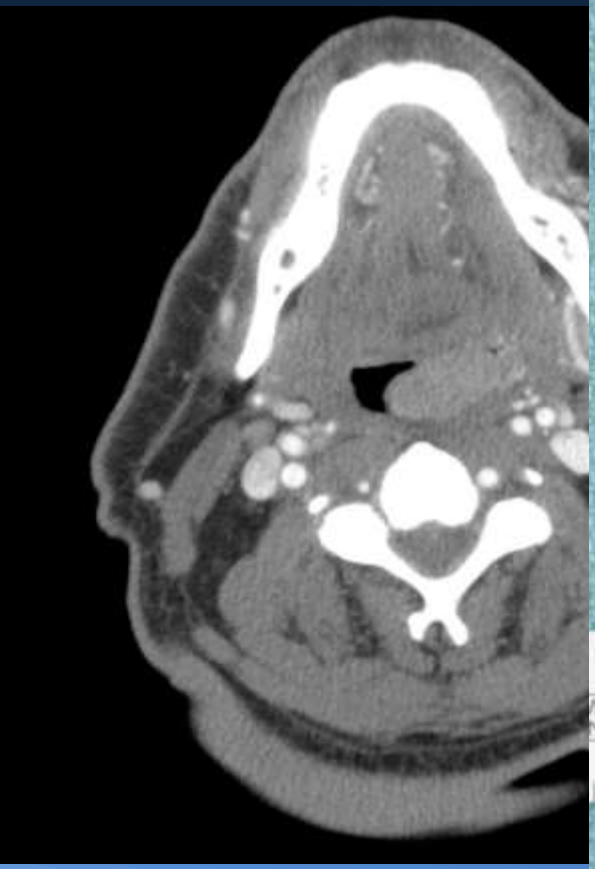
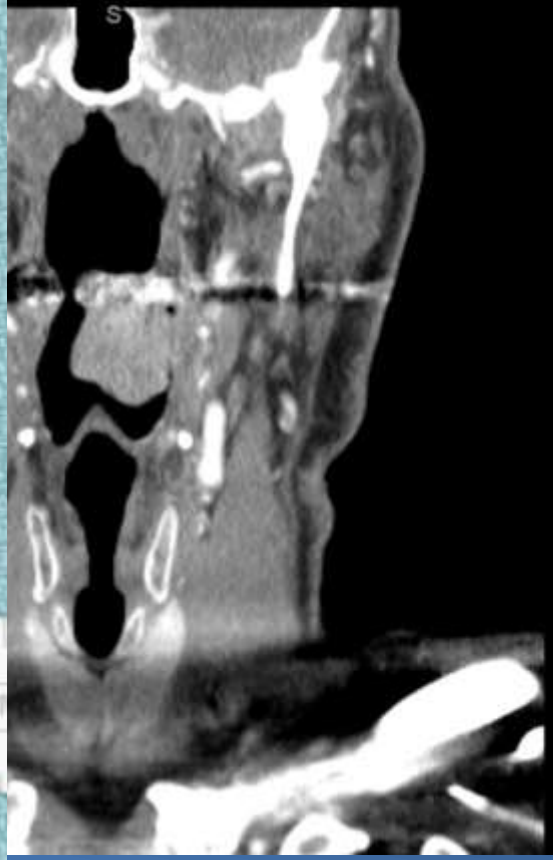
TransOral Robotic Surgery (TORS)

Patient Selection





T3N0 SCC, p16+

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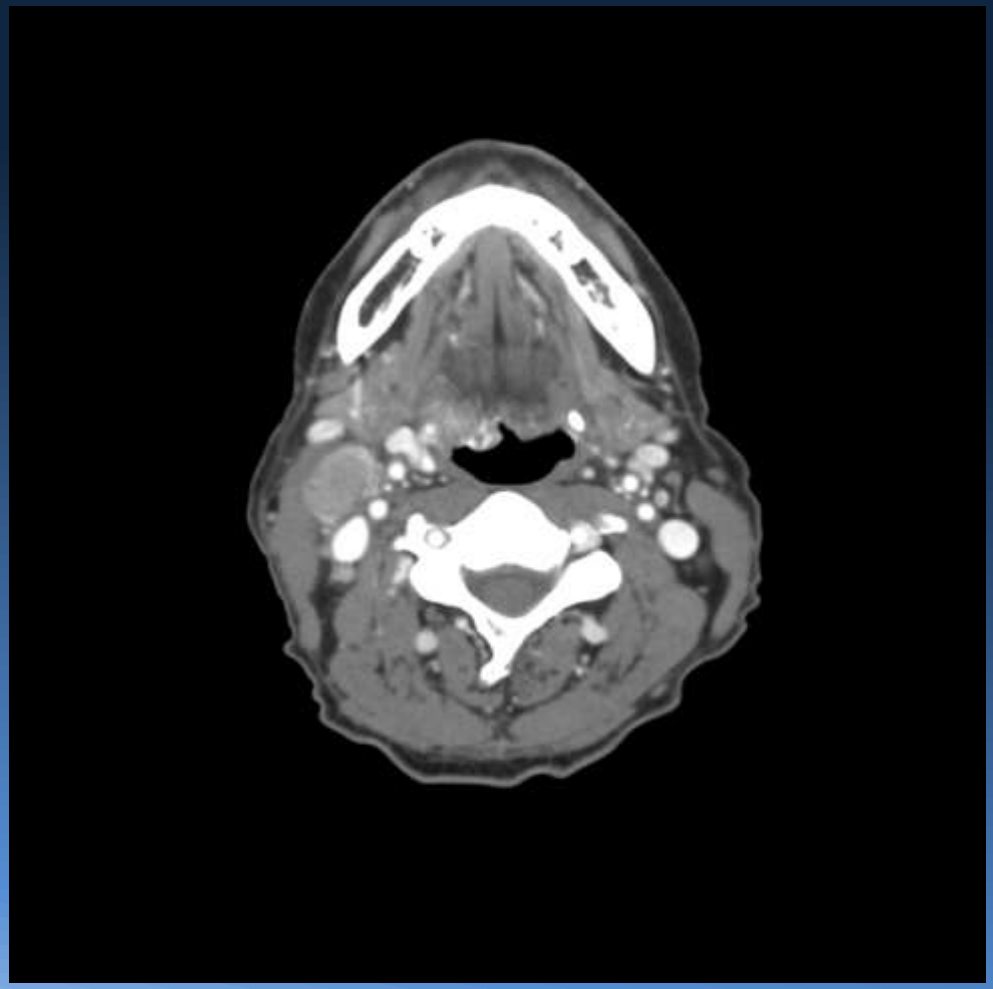
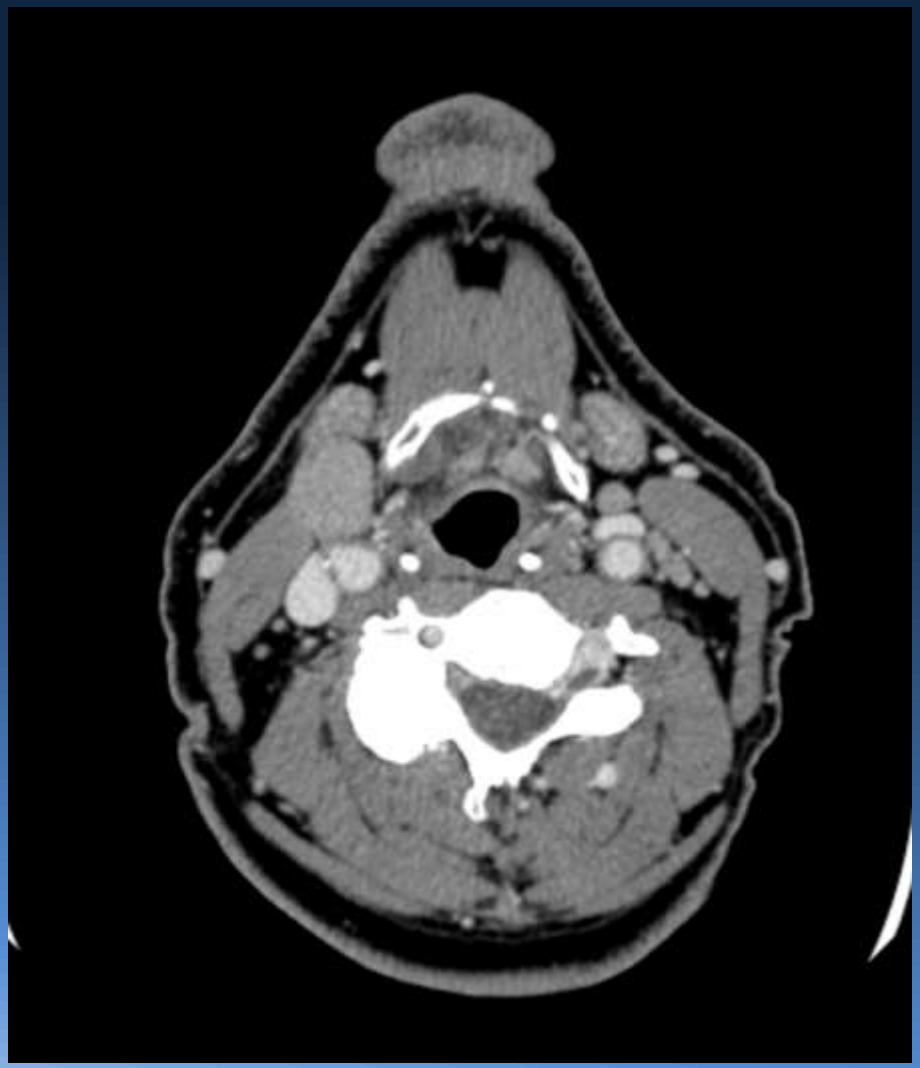
TransOral Robotic Surgery (TORS)
Patient Selection

- N1



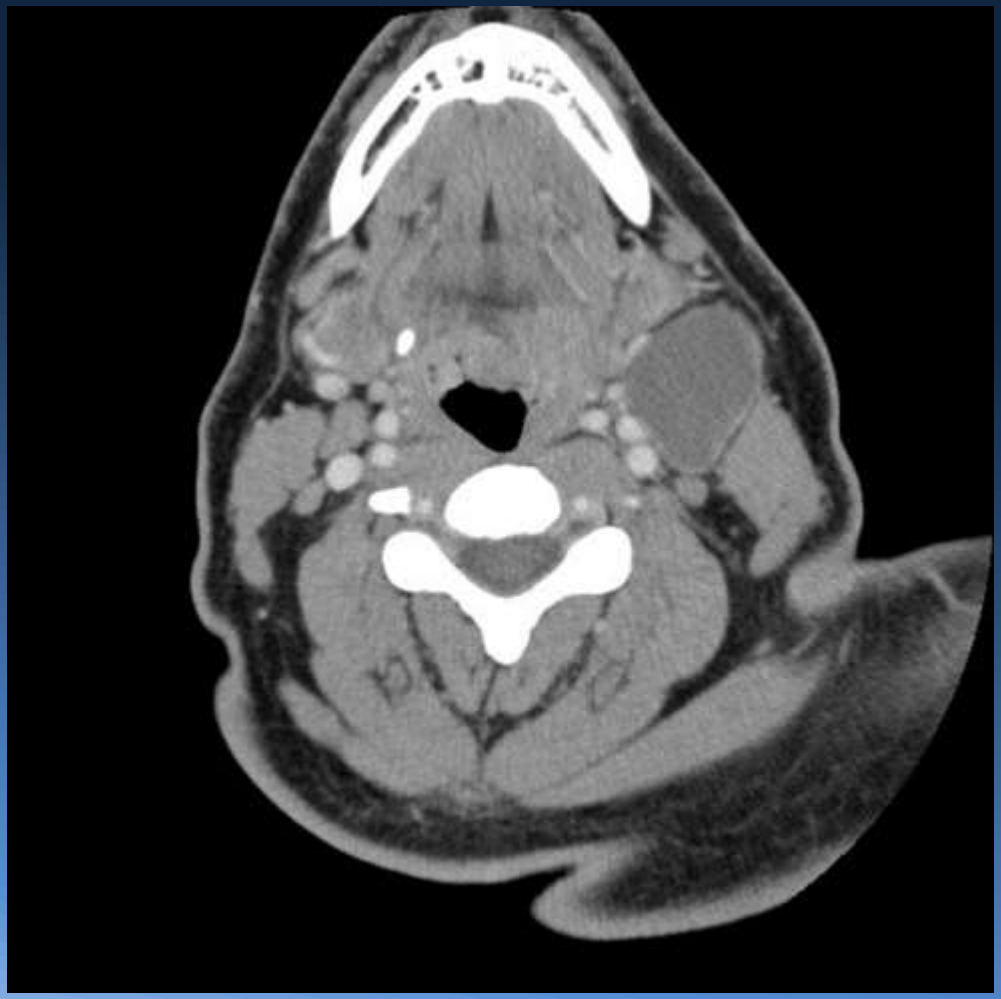
TransOral Robotic Surgery (TORS)
Patient Selection

- N1



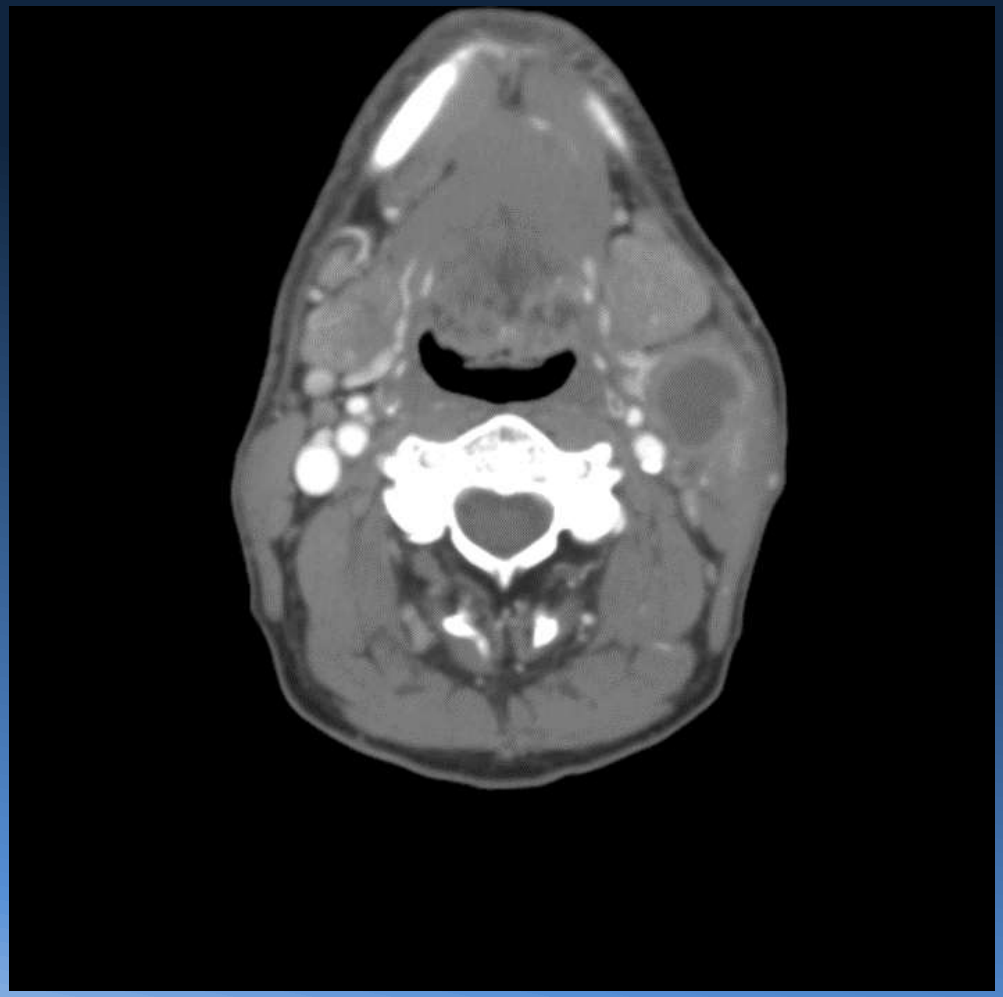
TransOral Robotic Surgery (TORS)
Patient Selection

- N2a



TransOral Robotic Surgery (TORS)
Patient Selection

- N2a



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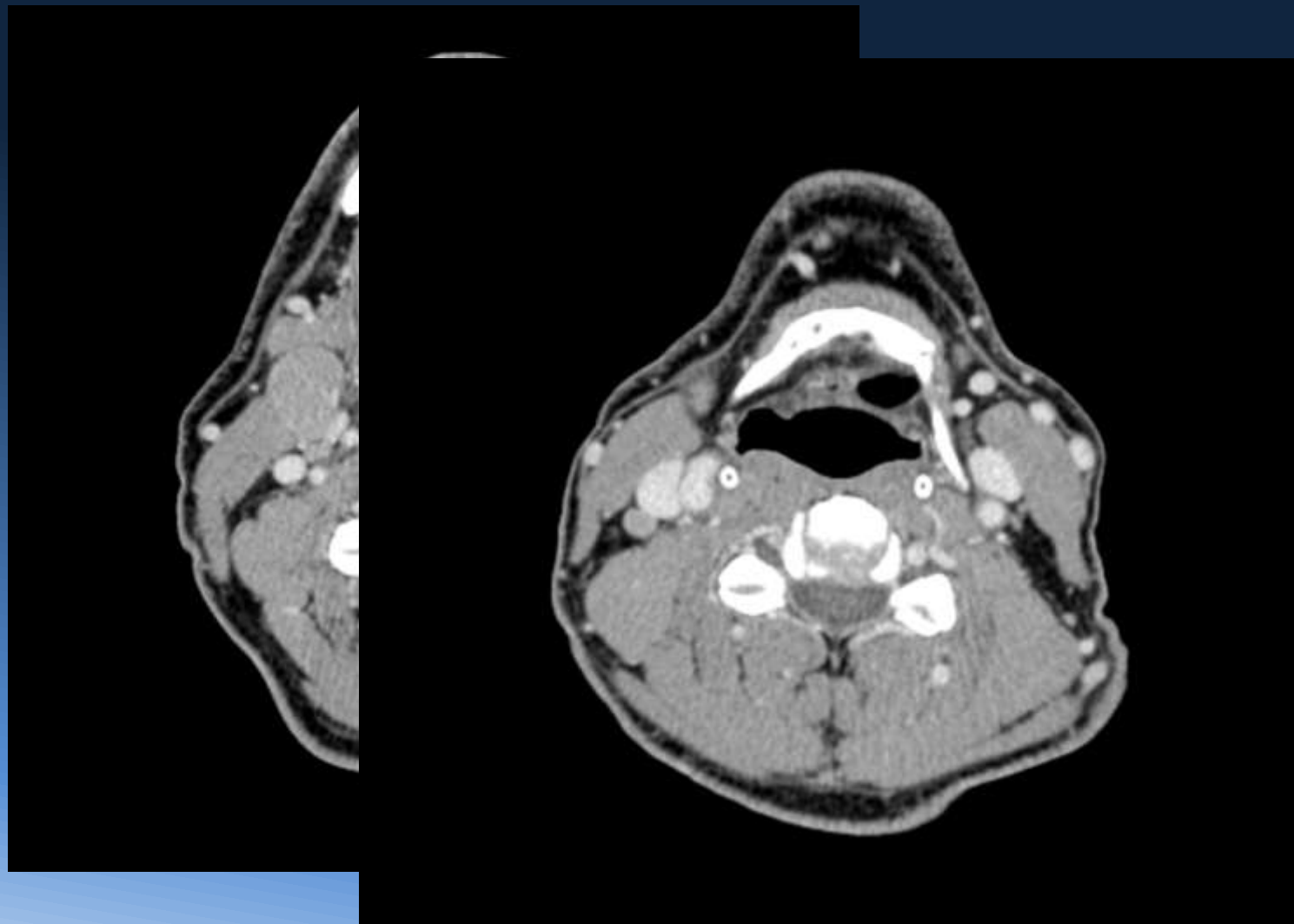
TransOral Robotic Surgery (TORS)

Patient Selection

- N2b



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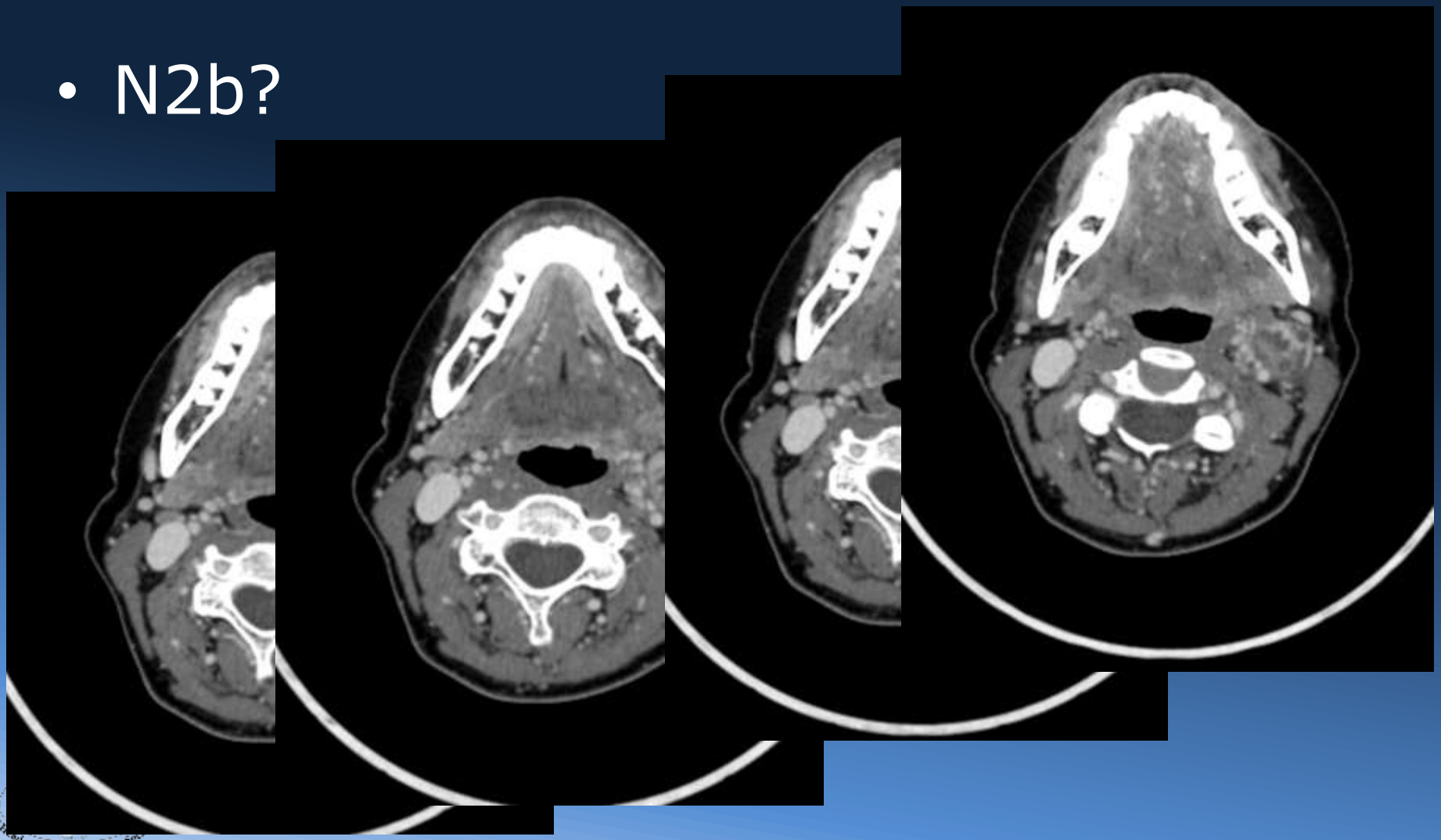
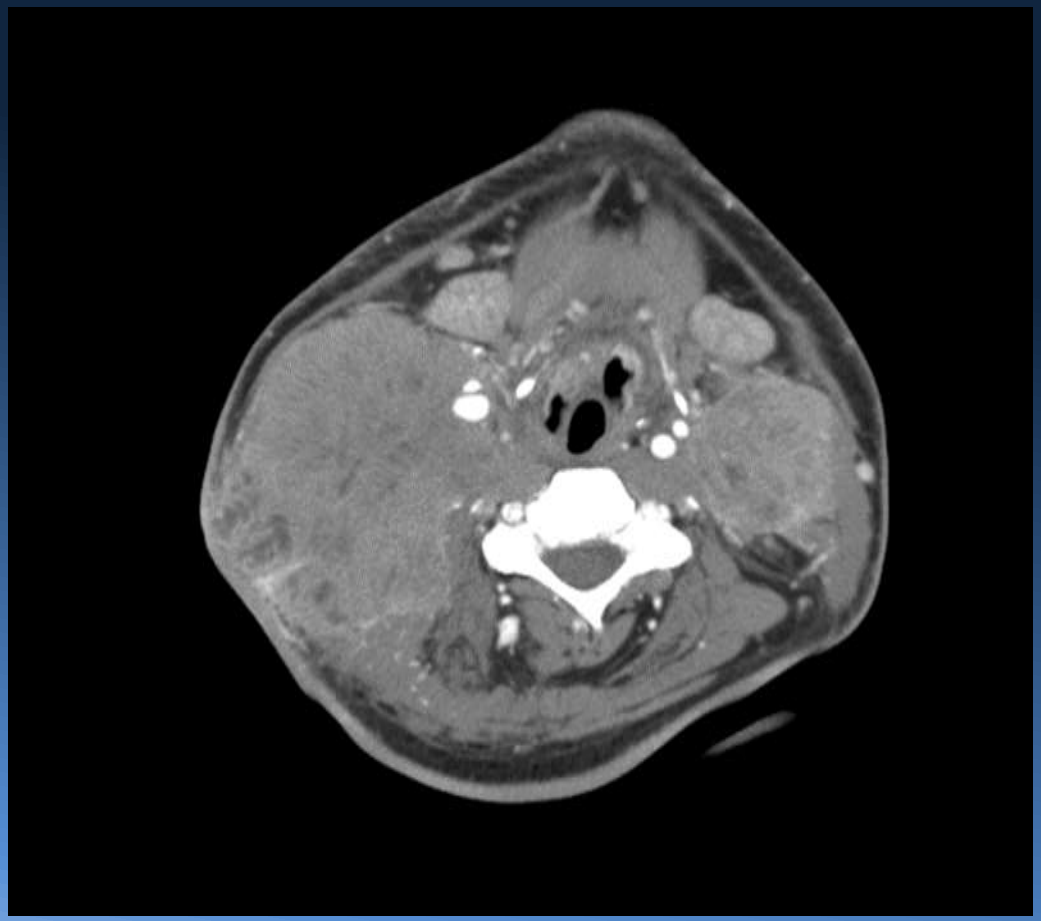
TransOral Robotic Surgery (TORS)
Patient Selection

- N2b?



TransOral Robotic Surgery (TORS)
Patient Selection

- N2c



TransOral Robotic Surgery (TORS)
Patient Selection

- N3

Questions

TransOral Robotic Surgery (TORS)

- What is it?
- Why do it?
- Which patients?
- How is it done?
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TransOral Robotic Surgery (TORS)
Anatomy

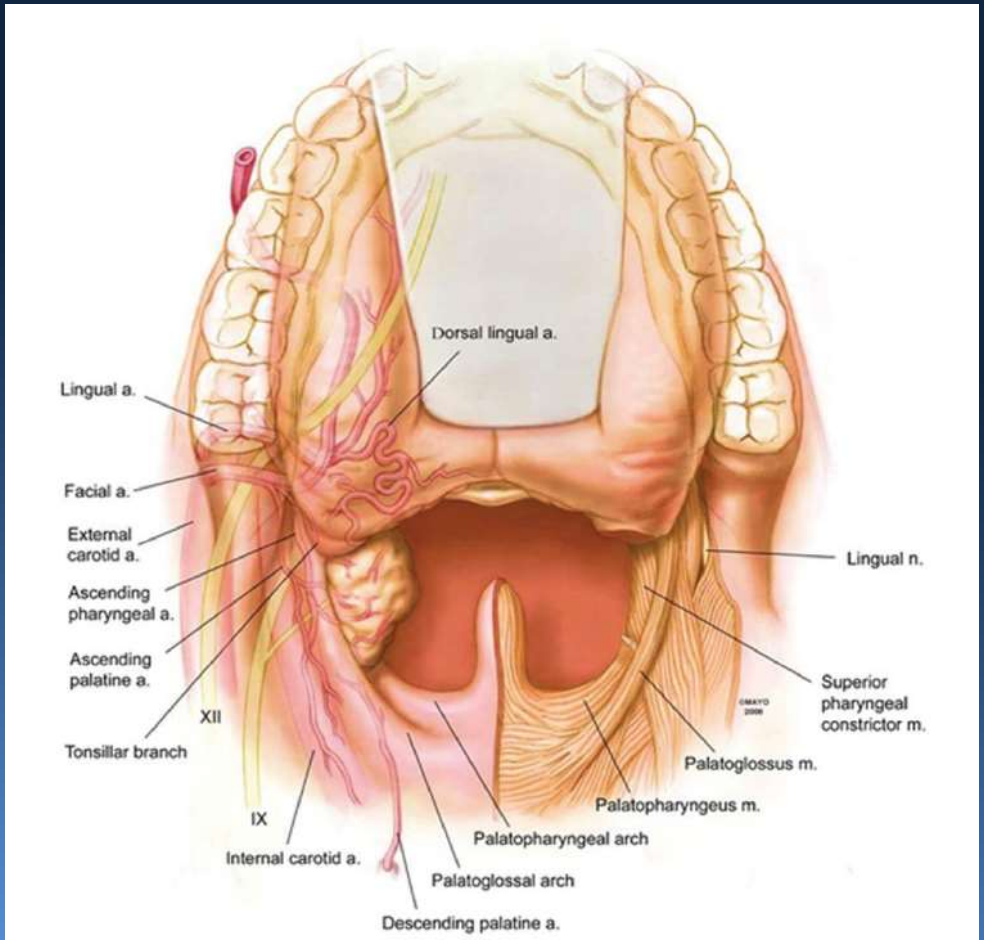


Fig. 2. Vessels and nerves of the oropharynx.

Moore EJ *et al*. *Clin Anatomy* 2012

Step 1: Patient Positioning

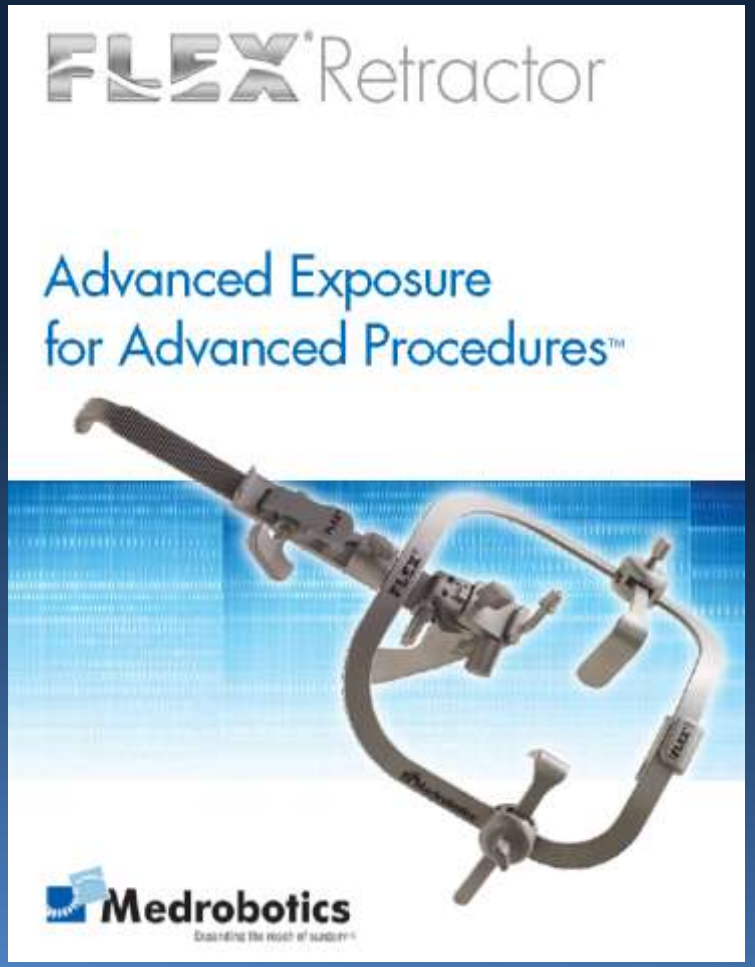
- Bed reversed
  - Turn head of bed 180 degrees

Step 1: Patient Positioning

- Nasal intubation
  - Shoulder roll

Step 2: Suspension Laryngoscopy

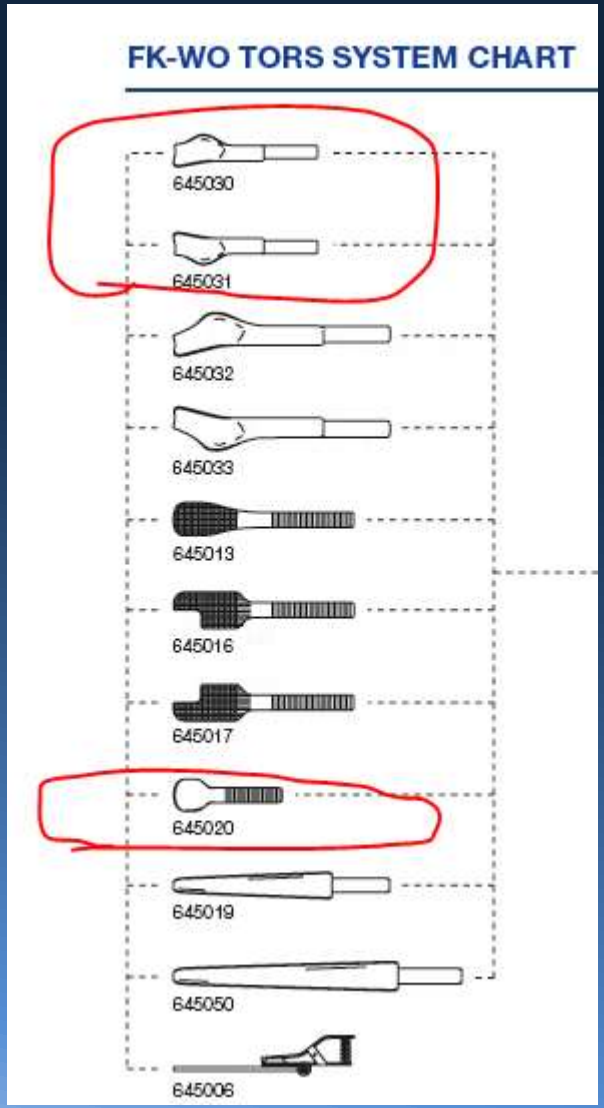
- Specialized Retractor
  - Tongue suture
  - Red rubber catheter +/-



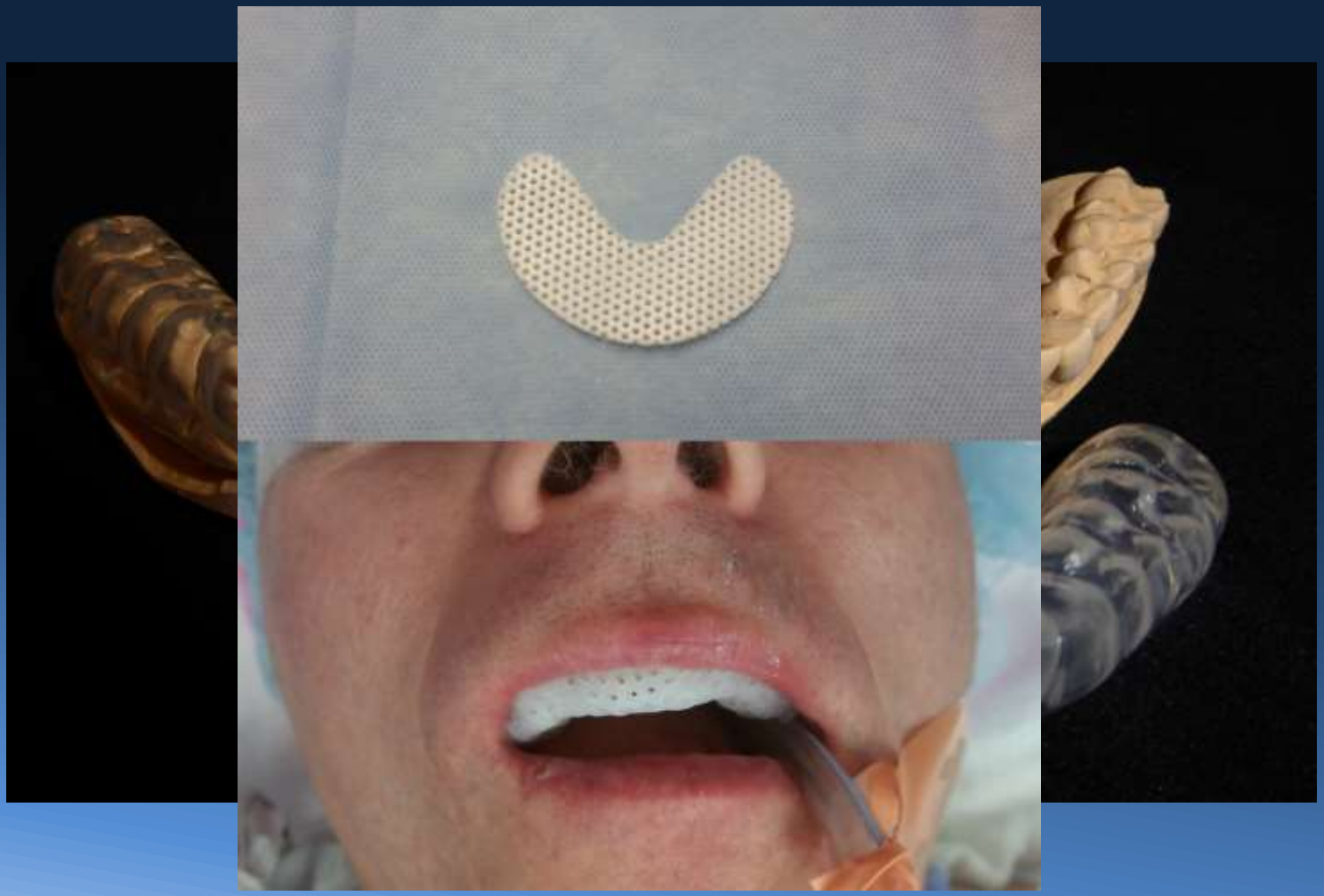
Gross ND. Atlas of Head and Neck Surgery Elsevier 2011

Step 2: Suspension Laryngoscopy

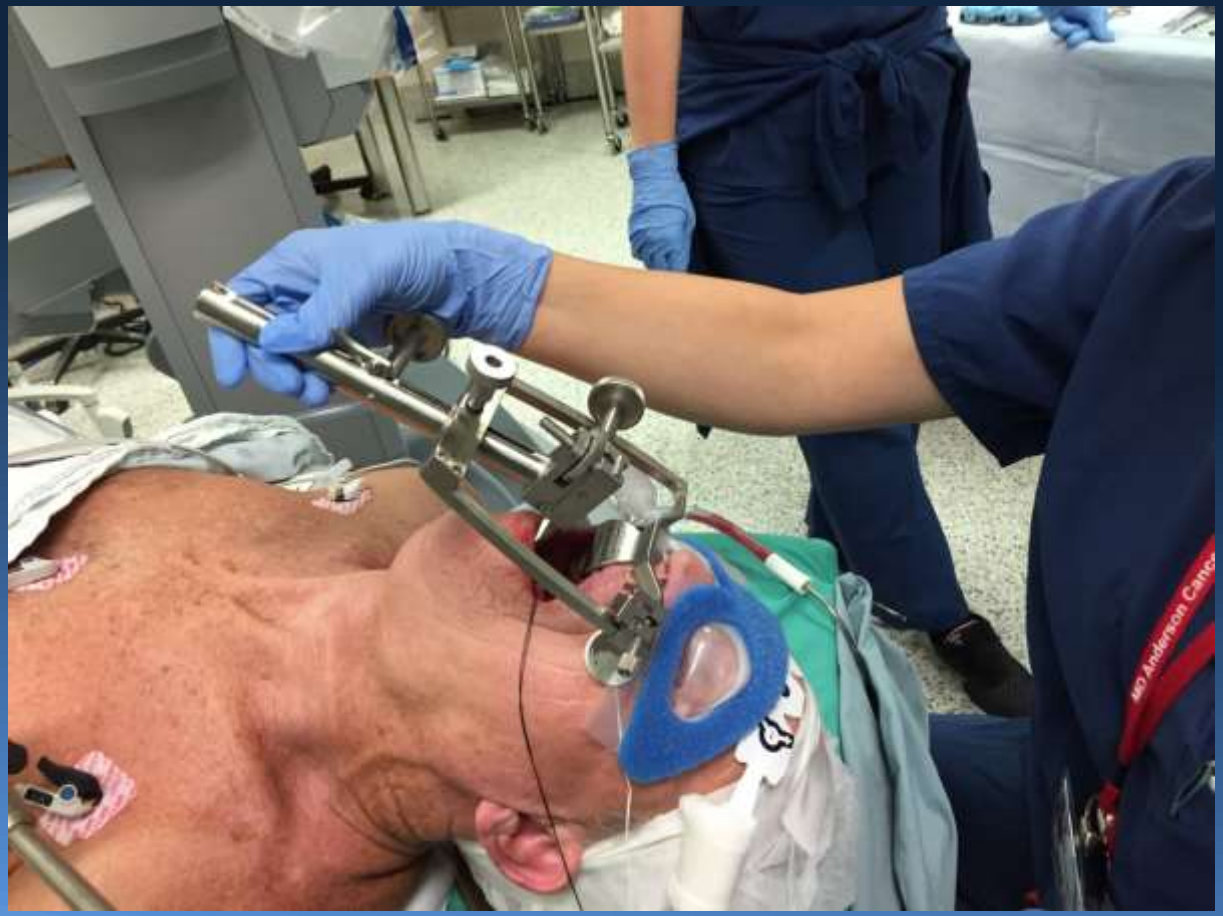
- Tongue blades



Step 2: Suspension Laryngoscopy



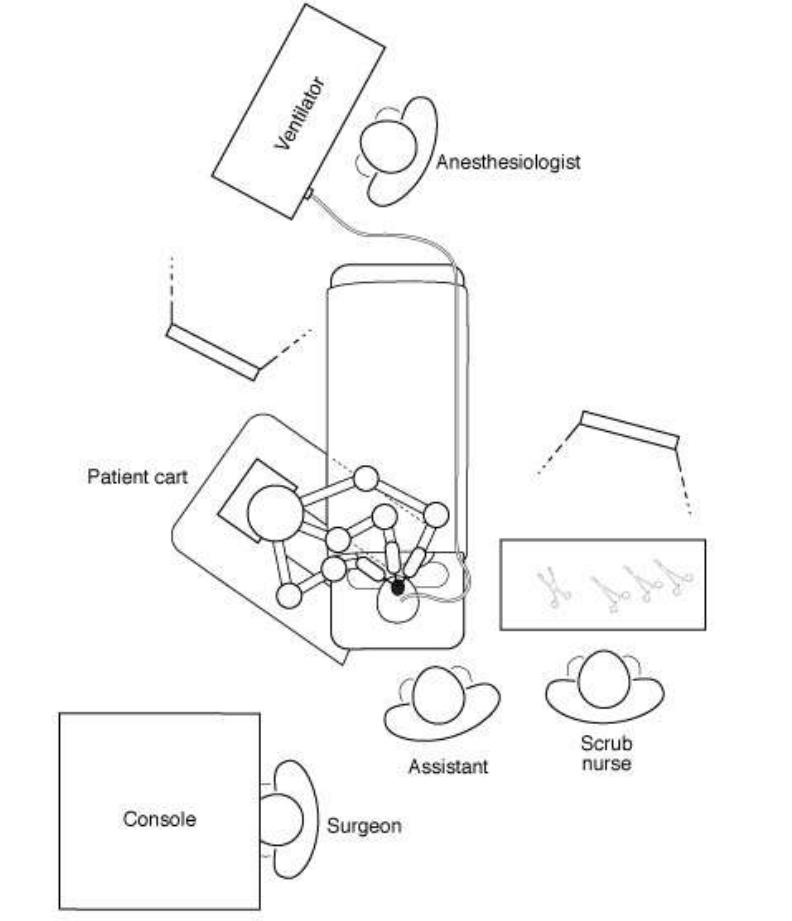
Step 2: Suspension Laryngoscopy



Step 2: Suspension Laryngoscopy

Step 2: Suspension Laryngoscopy

Step 3: Dock Patient Cart



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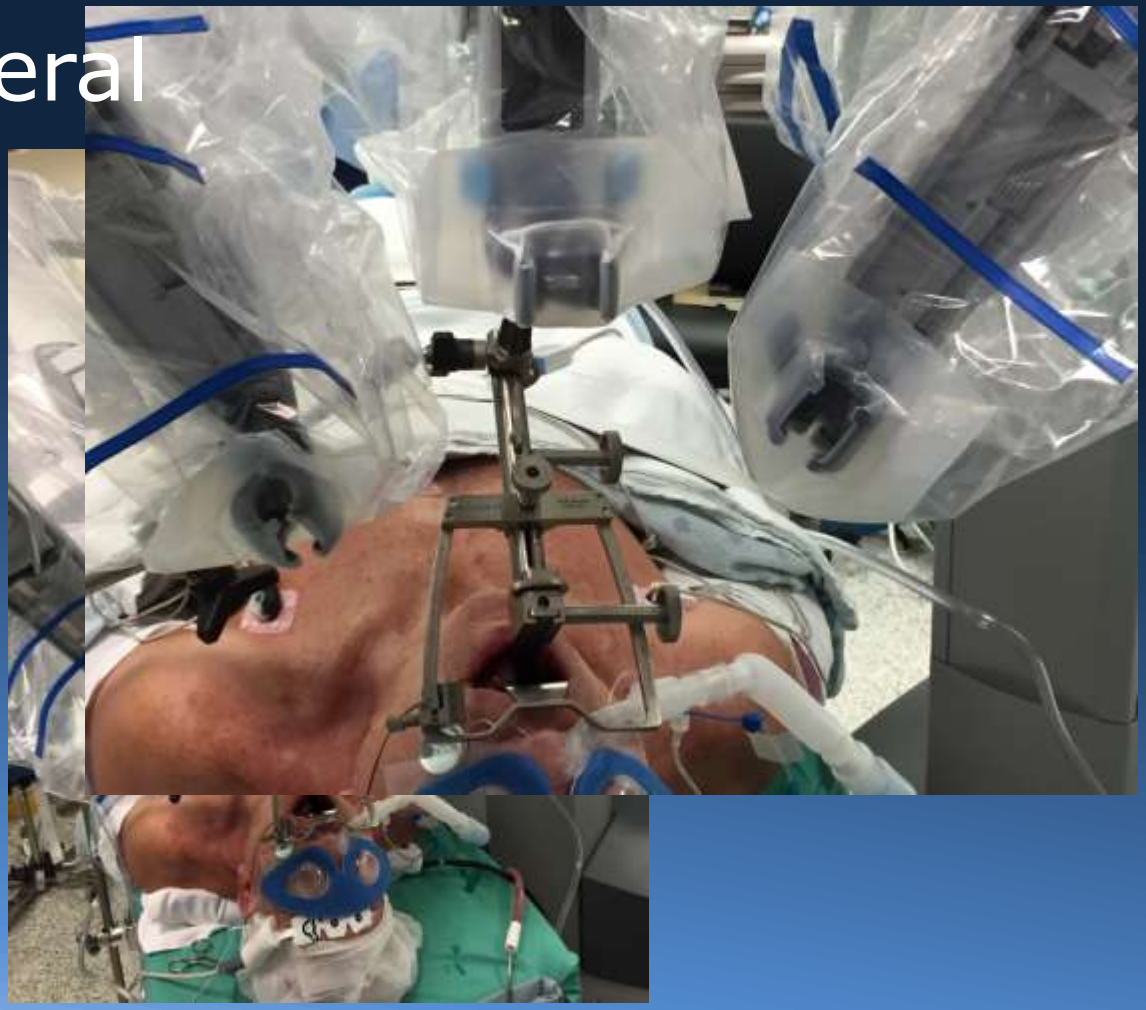
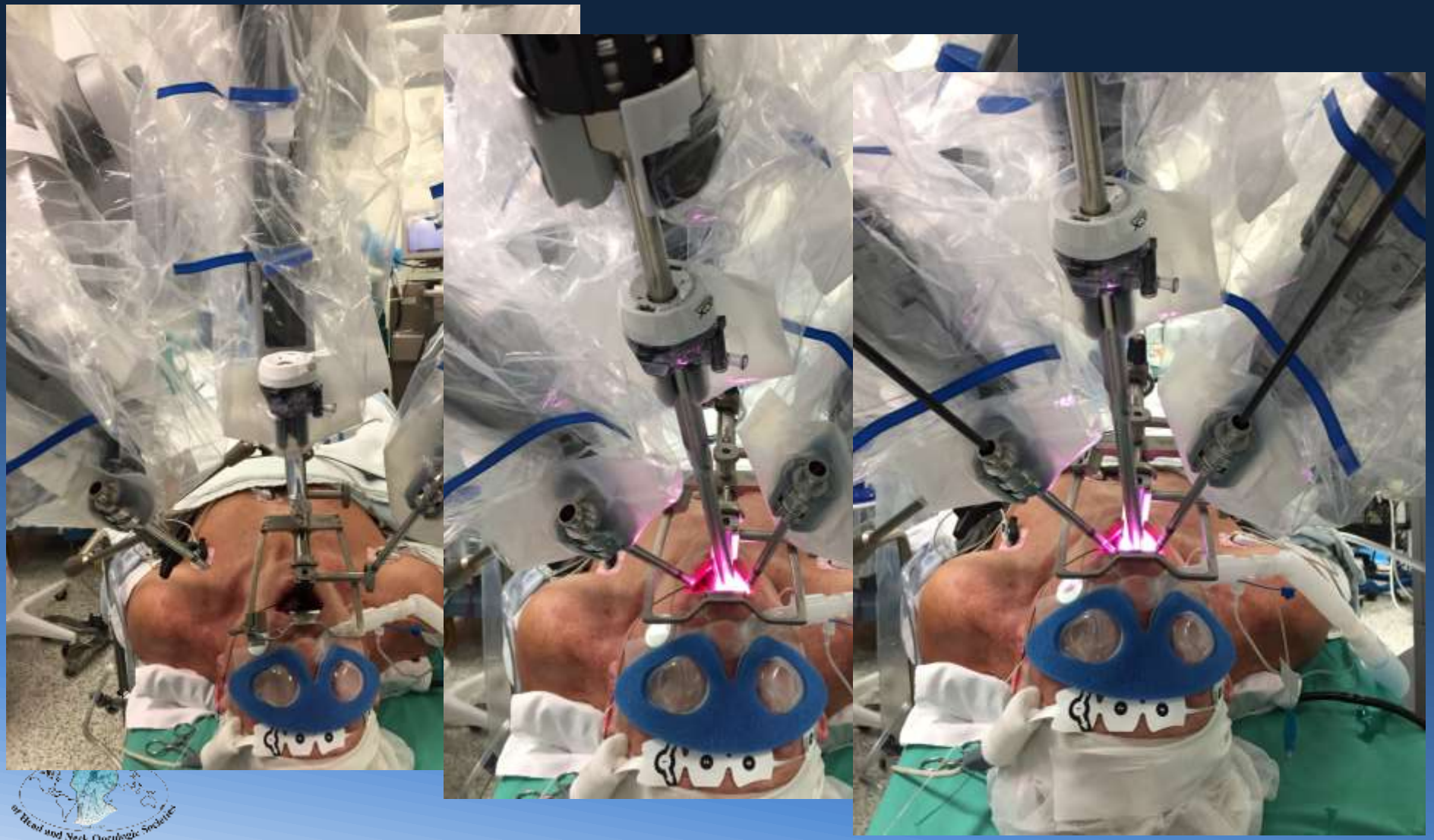
Step 3: Dock Patient Cart

Step 3: Dock Patient Cart

- Check general positioning

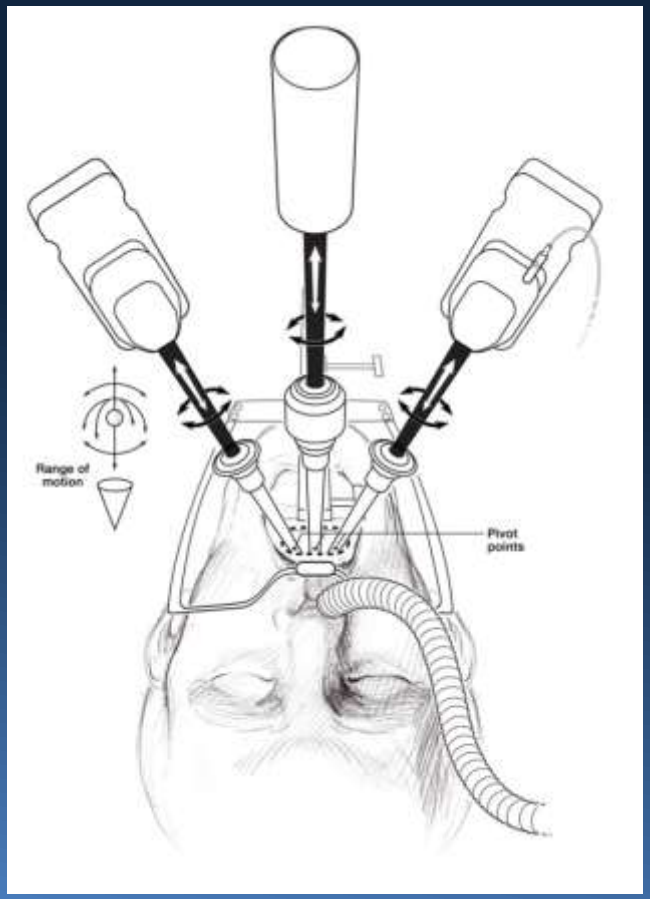


Step 4: Load Camera and Instruments



Step 4: Load Camera and Instruments

- Inverted "V" formation
- Instruments:
  - Bovie cautery
  - Maryland forceps
- Camera:
  - Tonsil = 0 degree
  - BOT = 30 degree ↑



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Step 4: Load Camera and Instruments

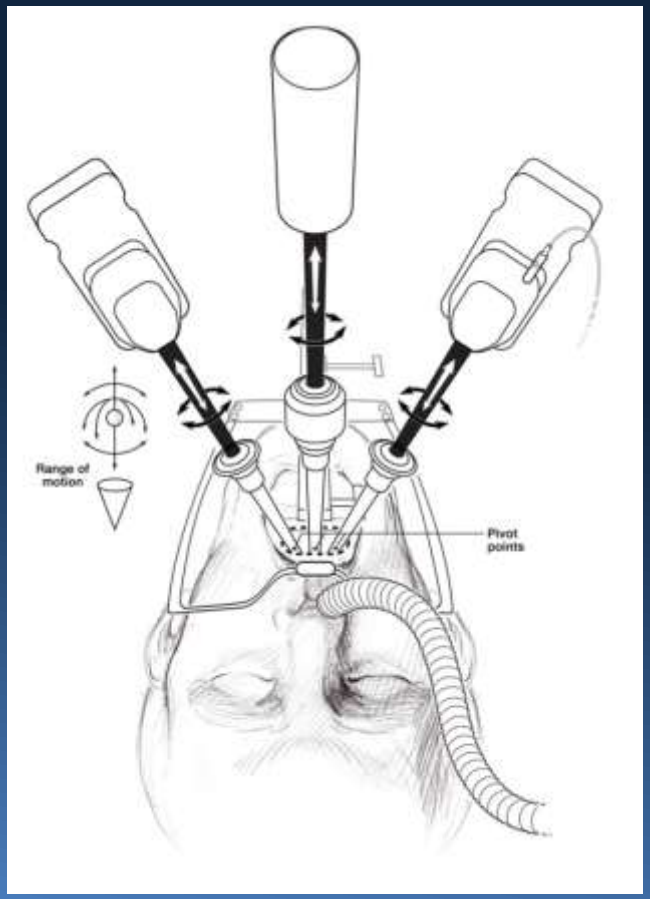
Tonsil

Base of Tongue

Larynx

Courtesy Scott Magnuson, MD

Step 4: Load Camera and Instruments



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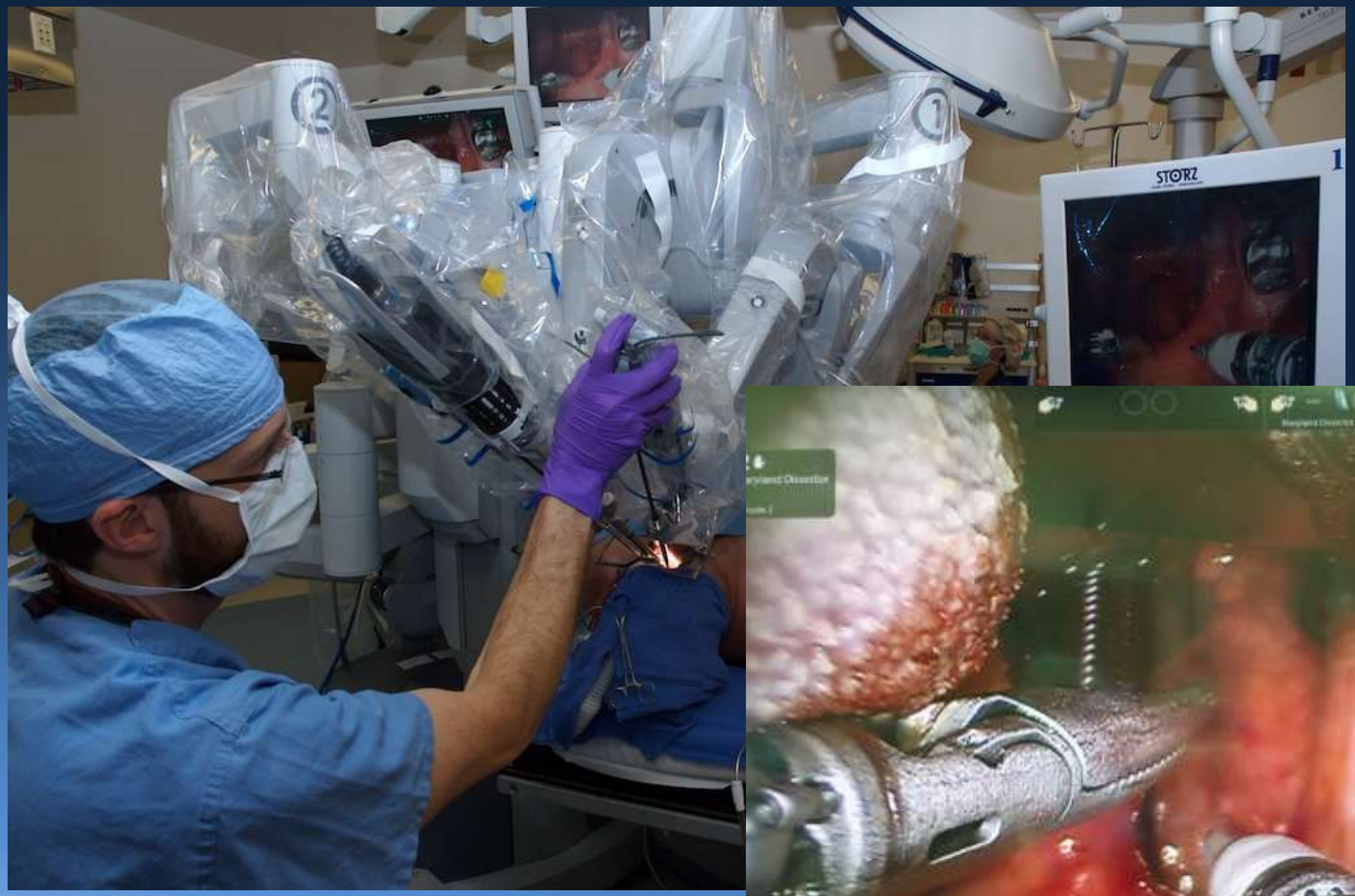

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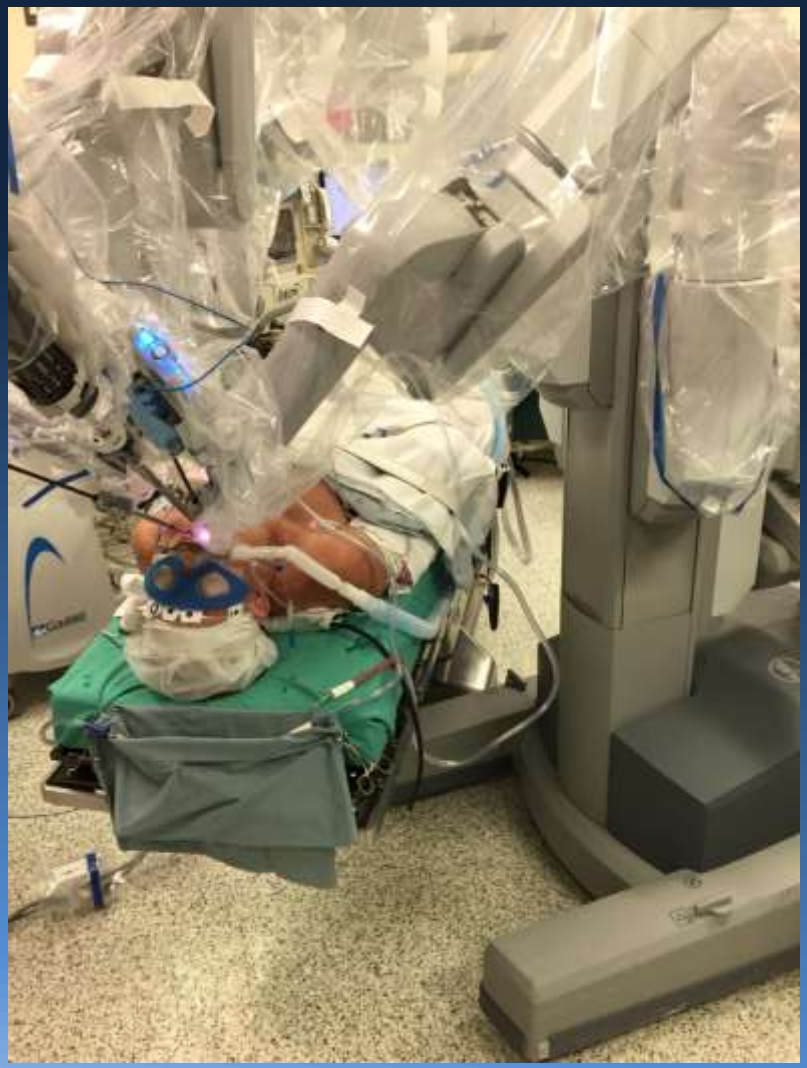
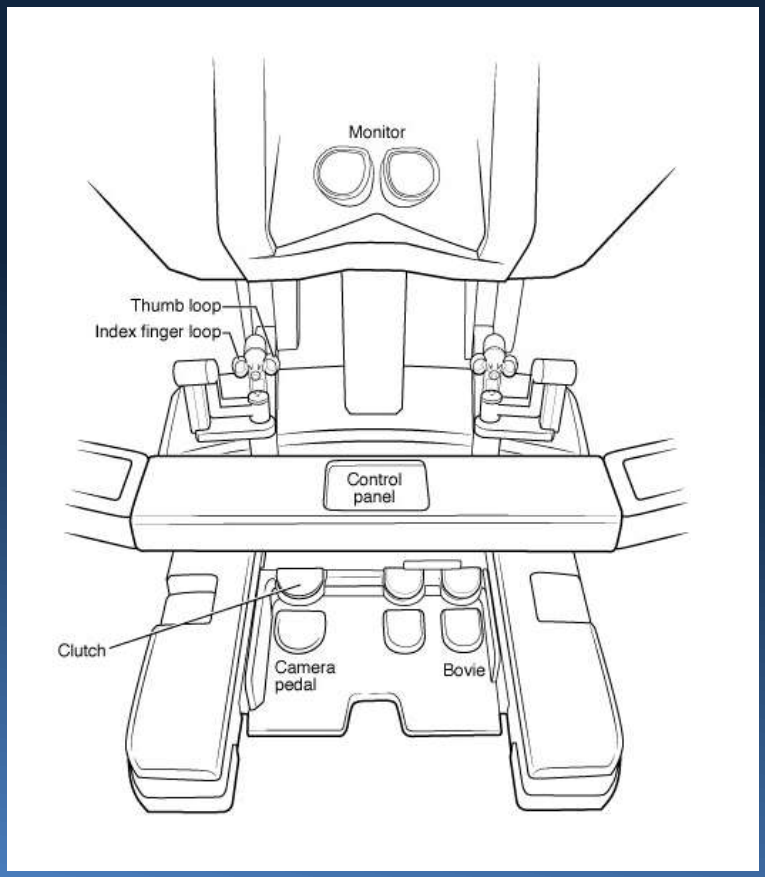
Step 4: Load Camera and Instruments



Bedside Assistant

- Dual Suction
  - Thoracic
- Clip appliers

Orientation / Inspection



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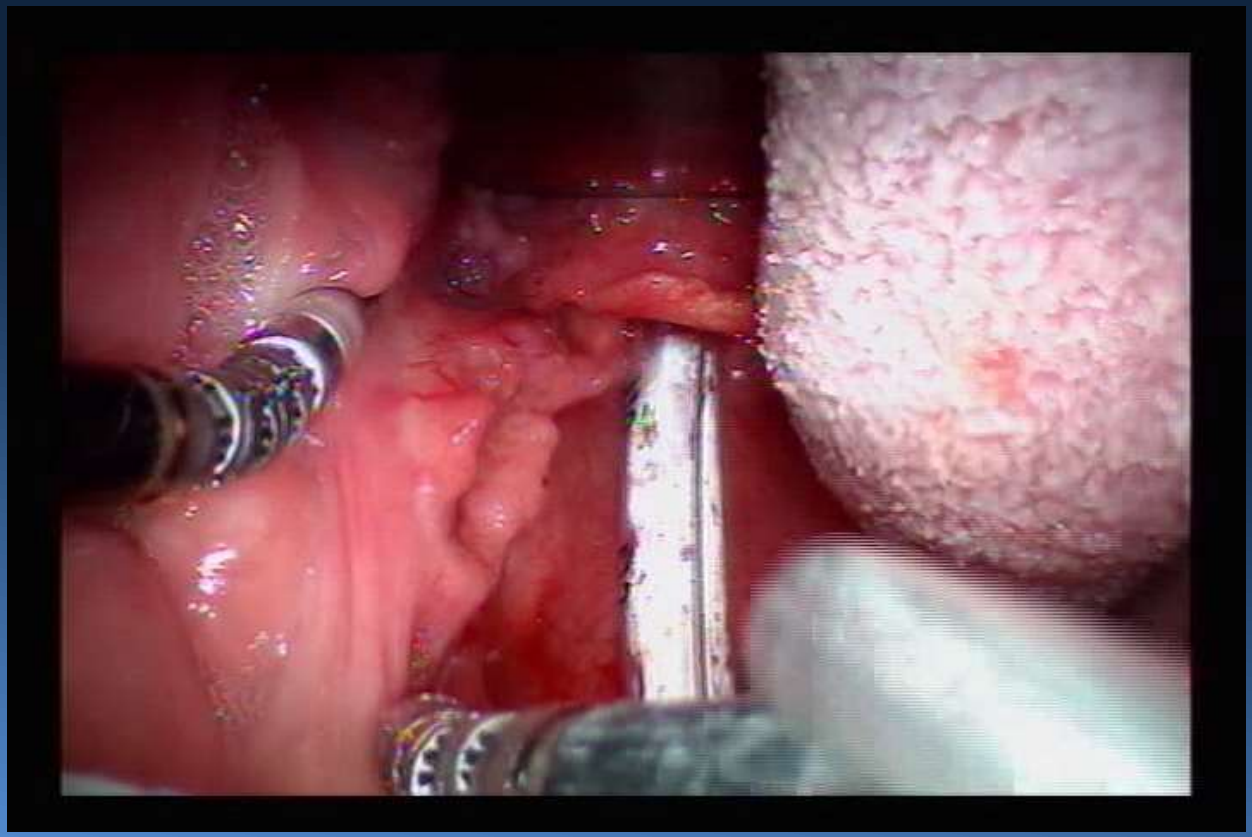
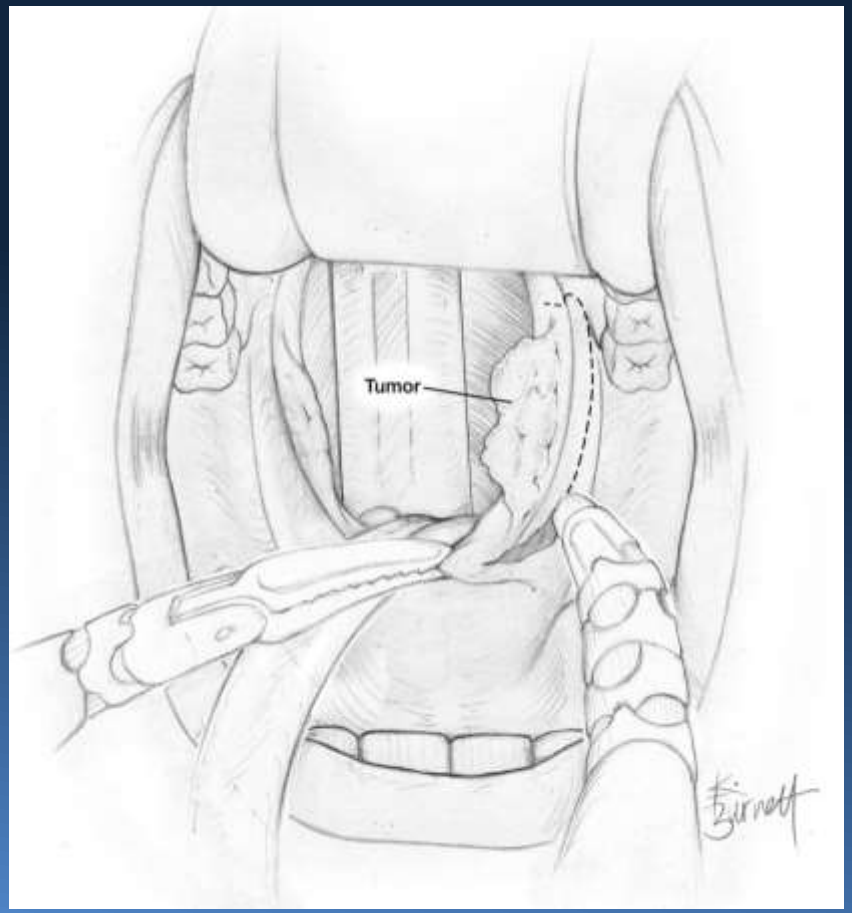
Orientation / Inspection

Orientation / Inspection



Mucosal Cuts

- Superior to inferior
- Ptyergomandibular raphe
- 1cm margins



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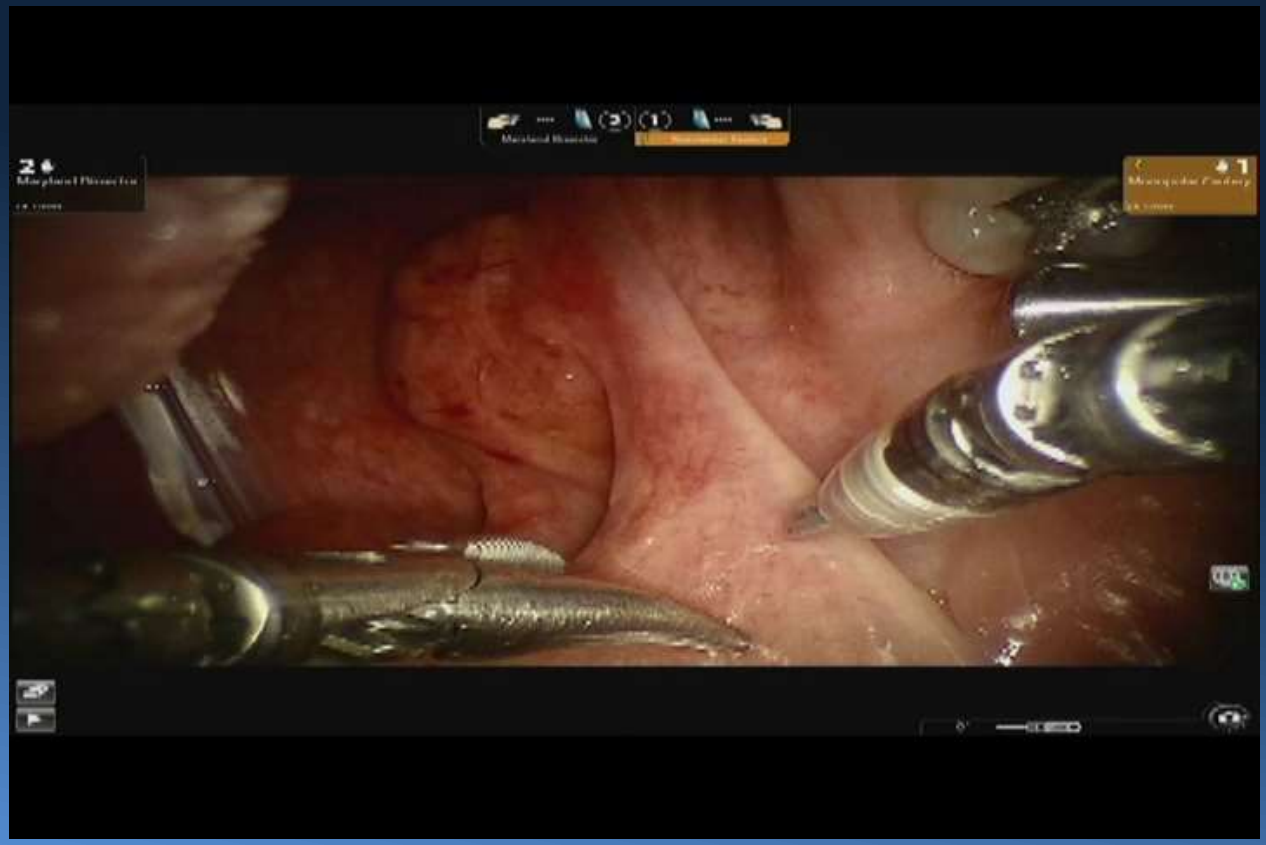
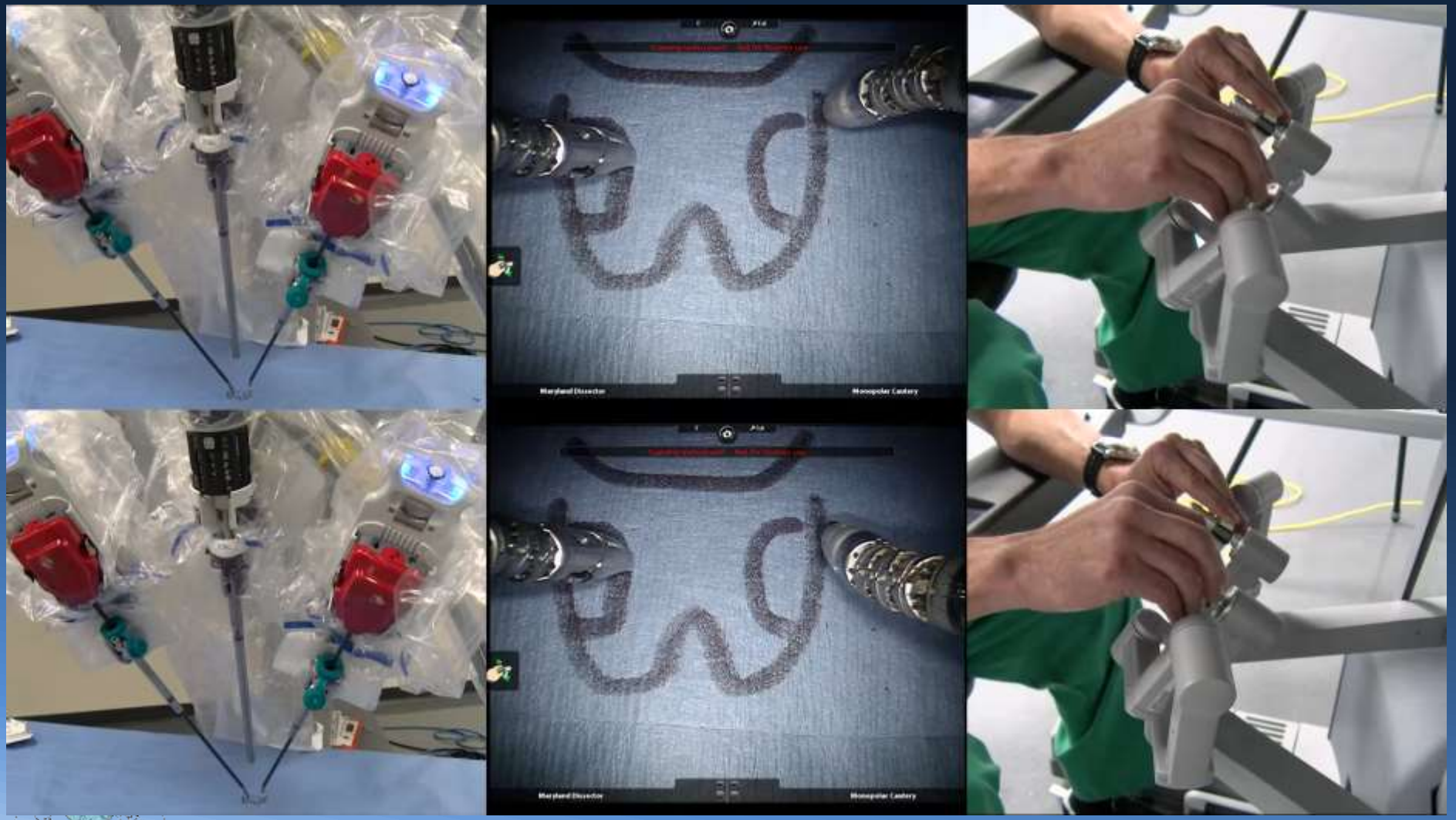
Mucosal Cuts



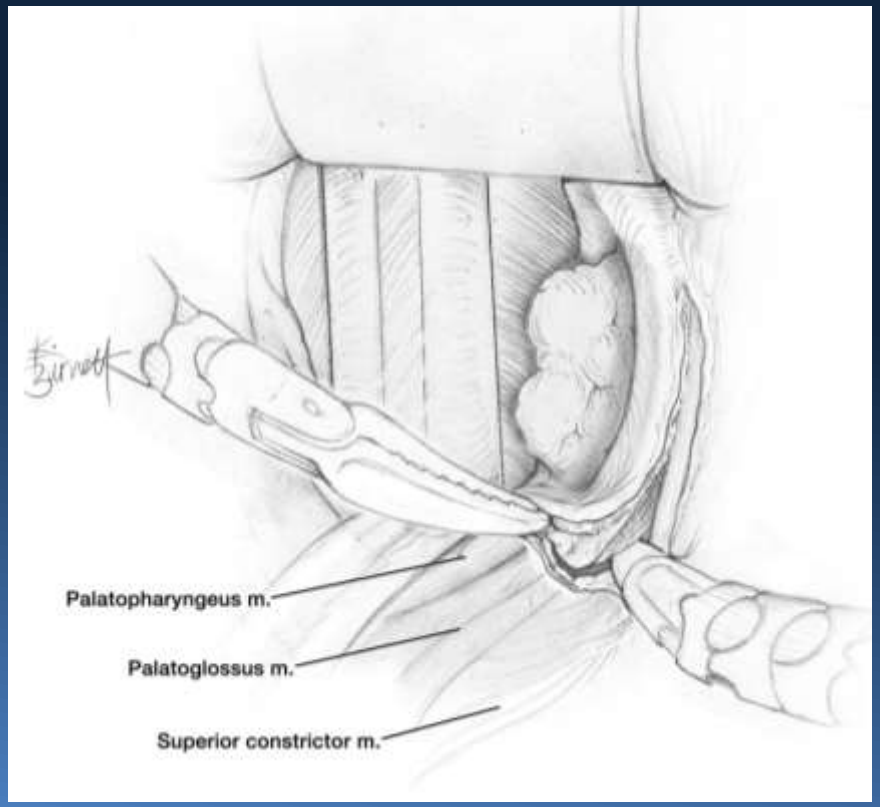
TransOral Robotic Surgery (TORS)
Technique



Courtesy Scott Magnuson, MD

Dissect Submucosal Muscle Layer

- Palatoglossus
- Palatopharyngeus
- Superior constrictor muscle



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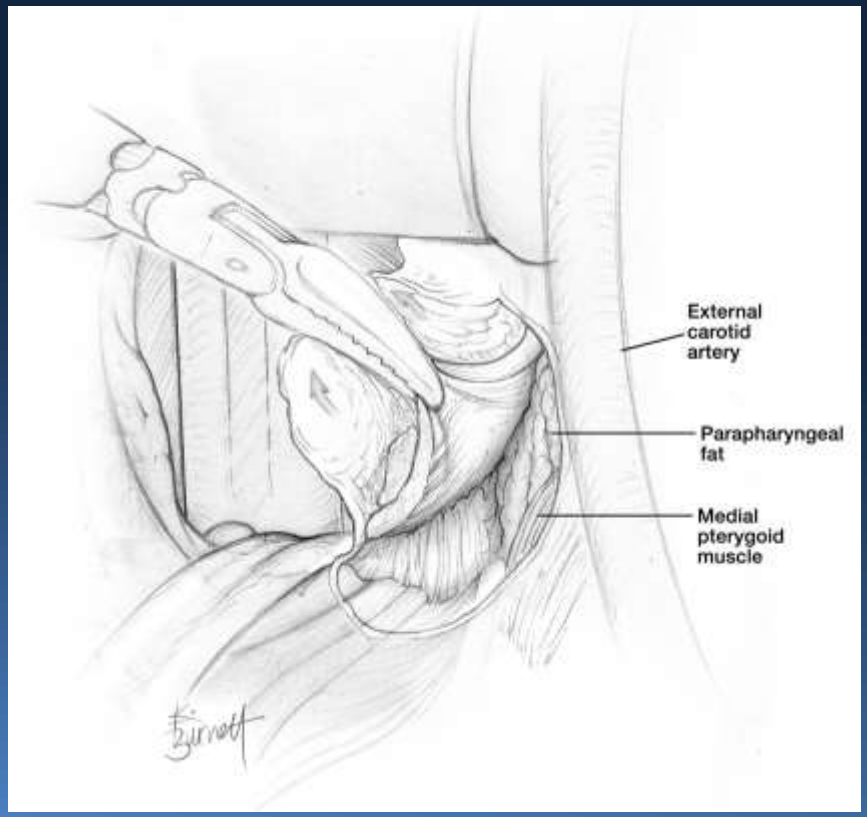
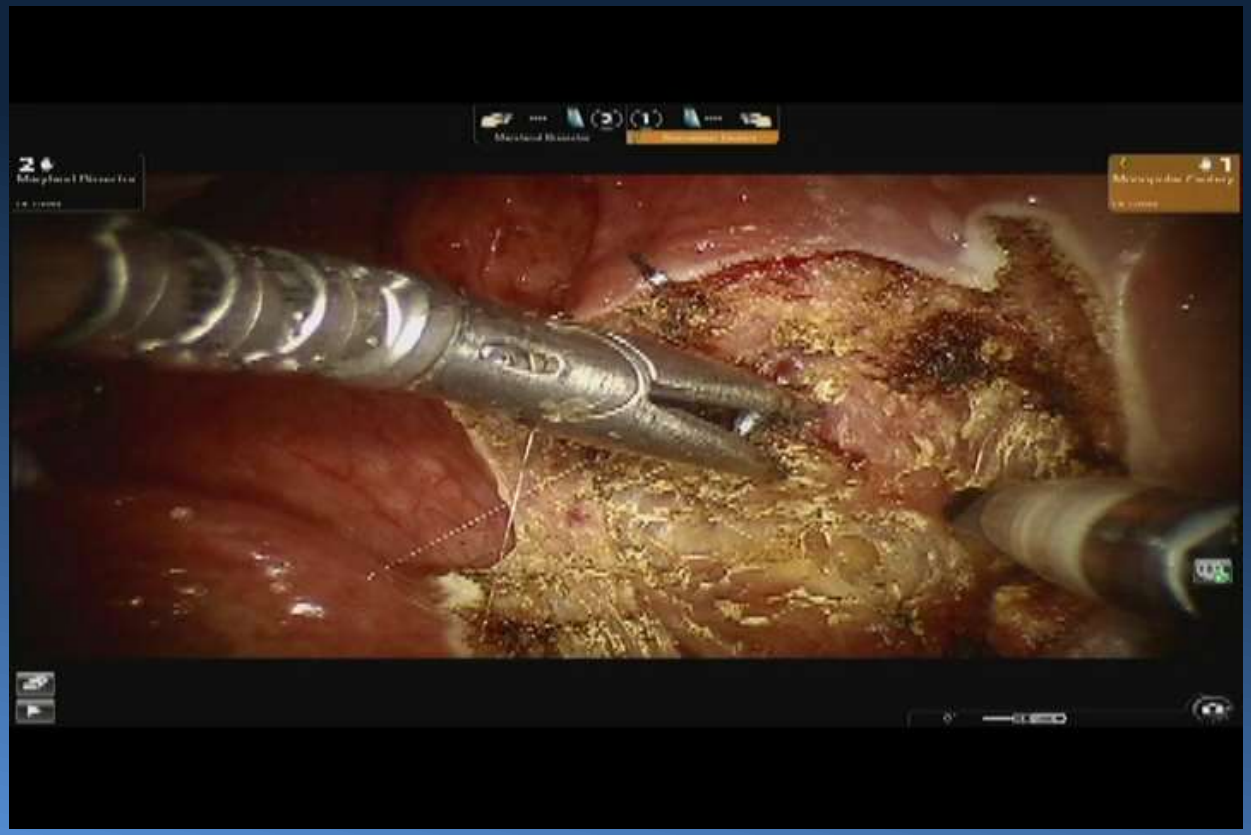
Identify Parapharyngeal Space

- Parapharyngeal fat
- Medial ptyergoid muscle
- Carotid pulsations



Gross ND. Atlas of Head and Neck Surgery Elsevier 2011

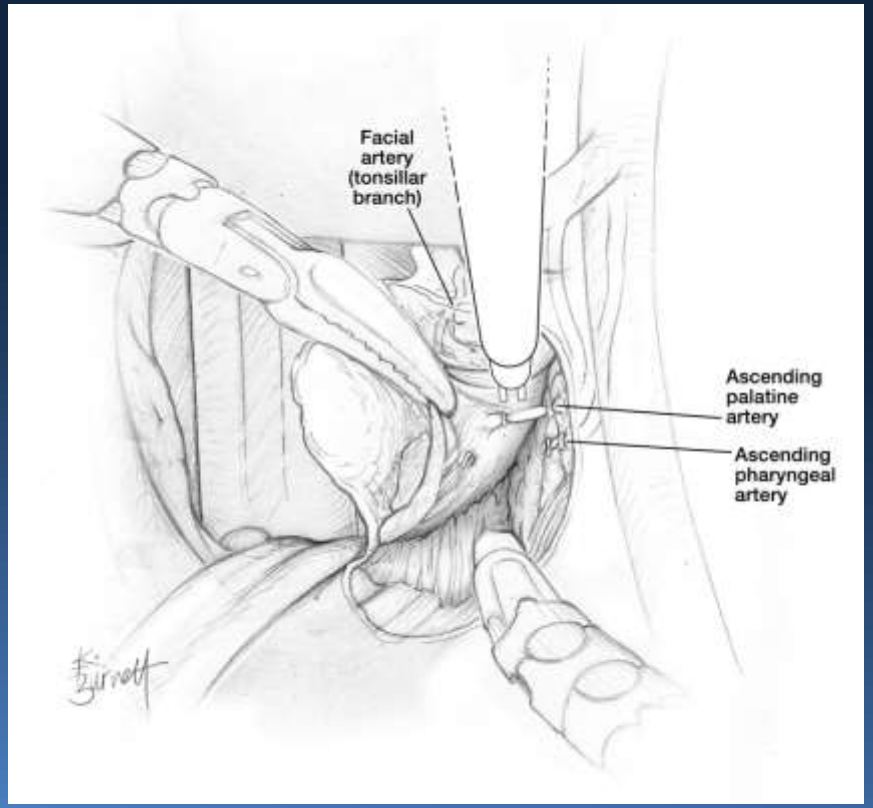
Identify Parapharyngeal Space



2017

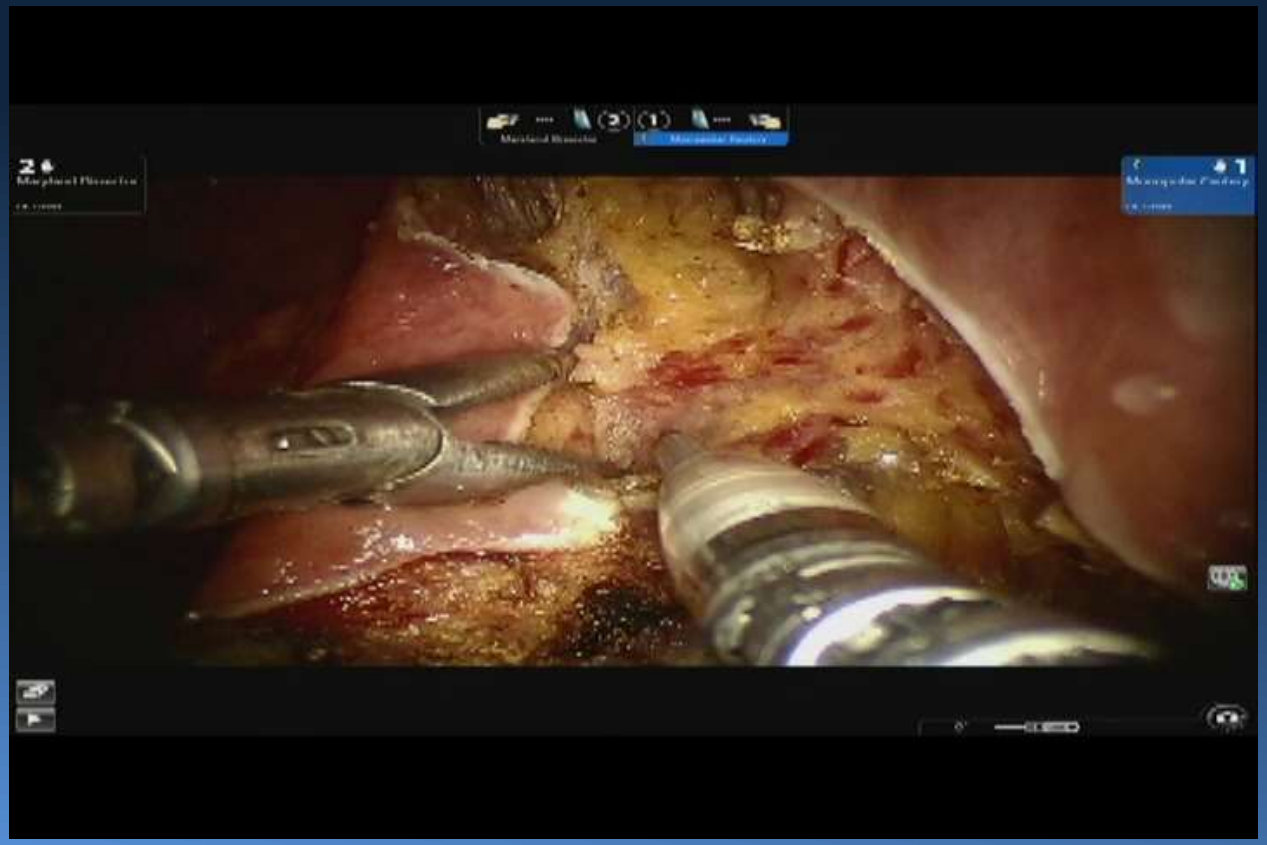
Apply Vascular Clips

- External carotid
  - Descending pharyngeal
  - Ascending pharyngeal
  - Ascending palatine
  - Tonsillar branch, facial artery



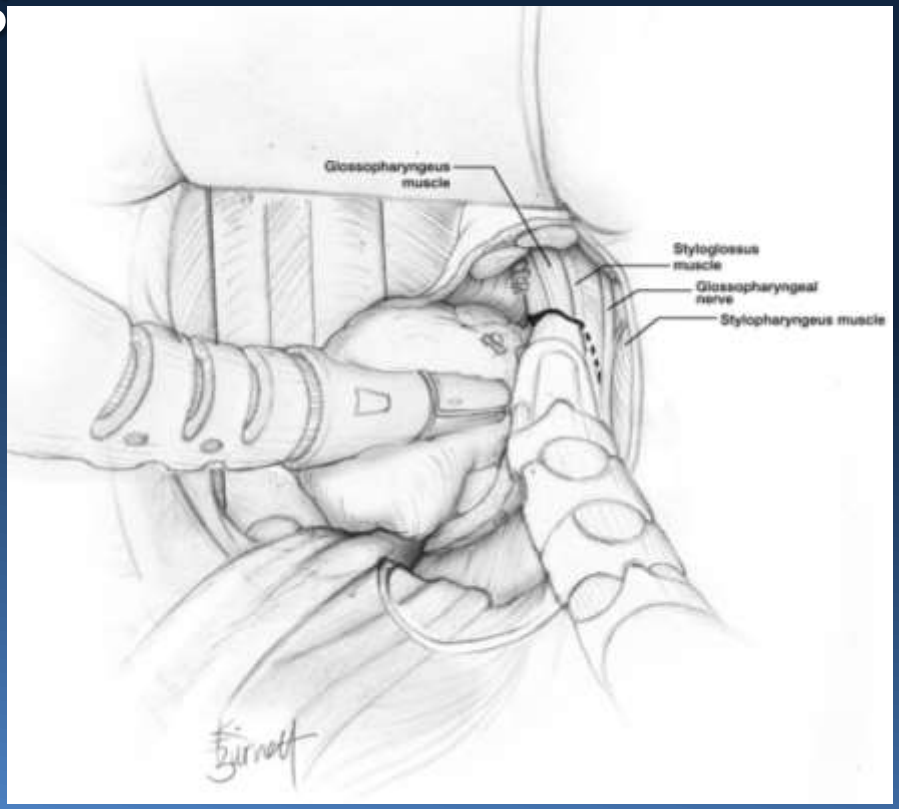
Gross ND. Atlas of Head and Neck Surgery Elsevier 2011

Apply Vascular Clips



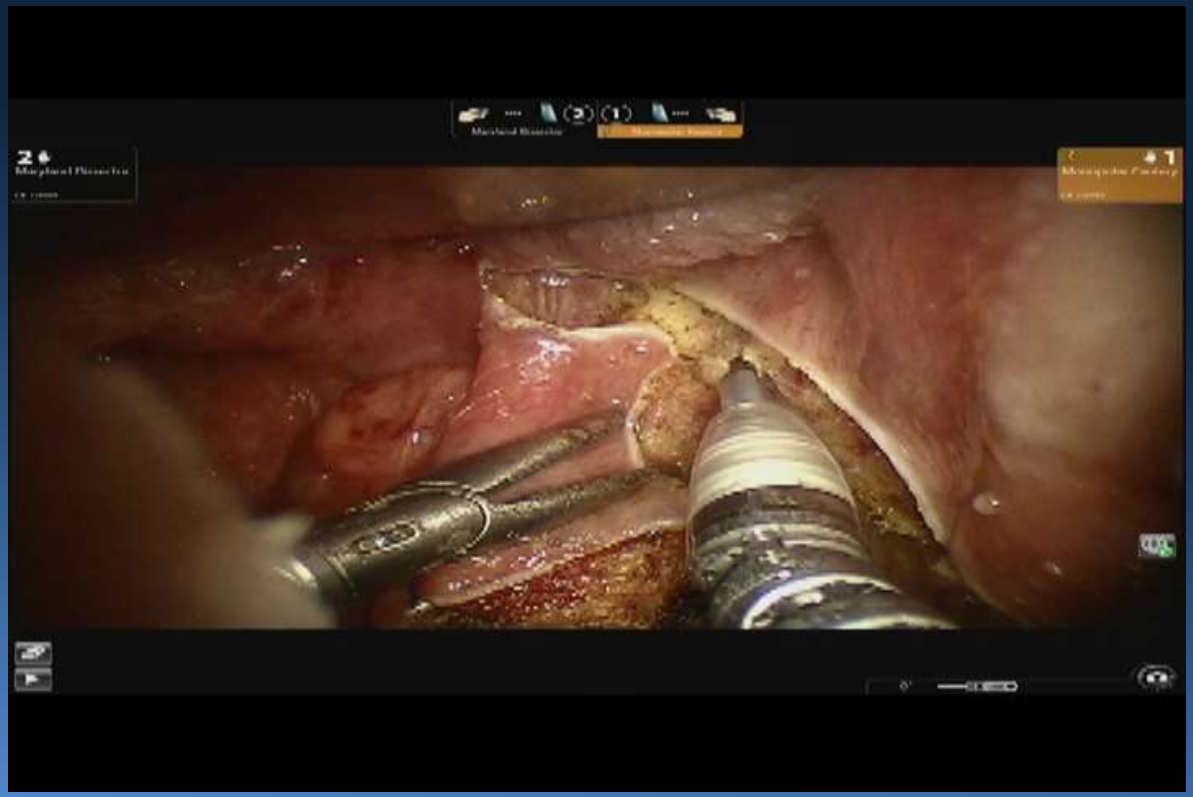
Divide Deep Muscle Layer

- Glossopharyngeus
- Styloglossus
- Glossopharyngeal nerve



Gross ND. Atlas of Head and Neck Surgery Elsevier 2011

Divide Deep Muscle Layer



TransOral Robotic Surgery (TORS)
Margins

- Management of margin status should be the same regardless of approach

TransOral Robotic Surgery (TORS)
Margins

- Management of margin status should be the same regardless of approach

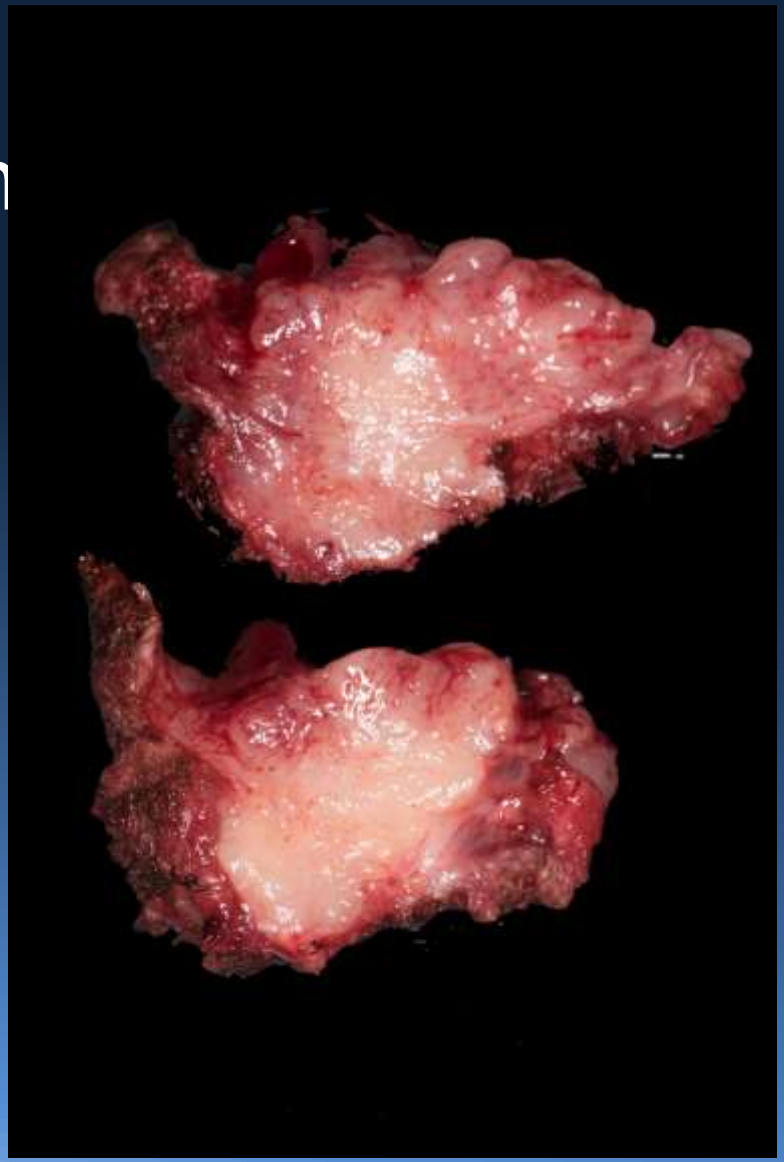
TransOral Robotic Surgery (TORS)

Margins

- Goal = 5mm margin

TransOral Robotic Surgery (TORS)
Margins

- Goal = 5mm margin



Questions

Perioperative Management

- Staging endoscopy sometimes helpful
- Tracheostomy rarely needed
- Neck dissection safe to perform during same surgery
  - Level 1 contents preserved

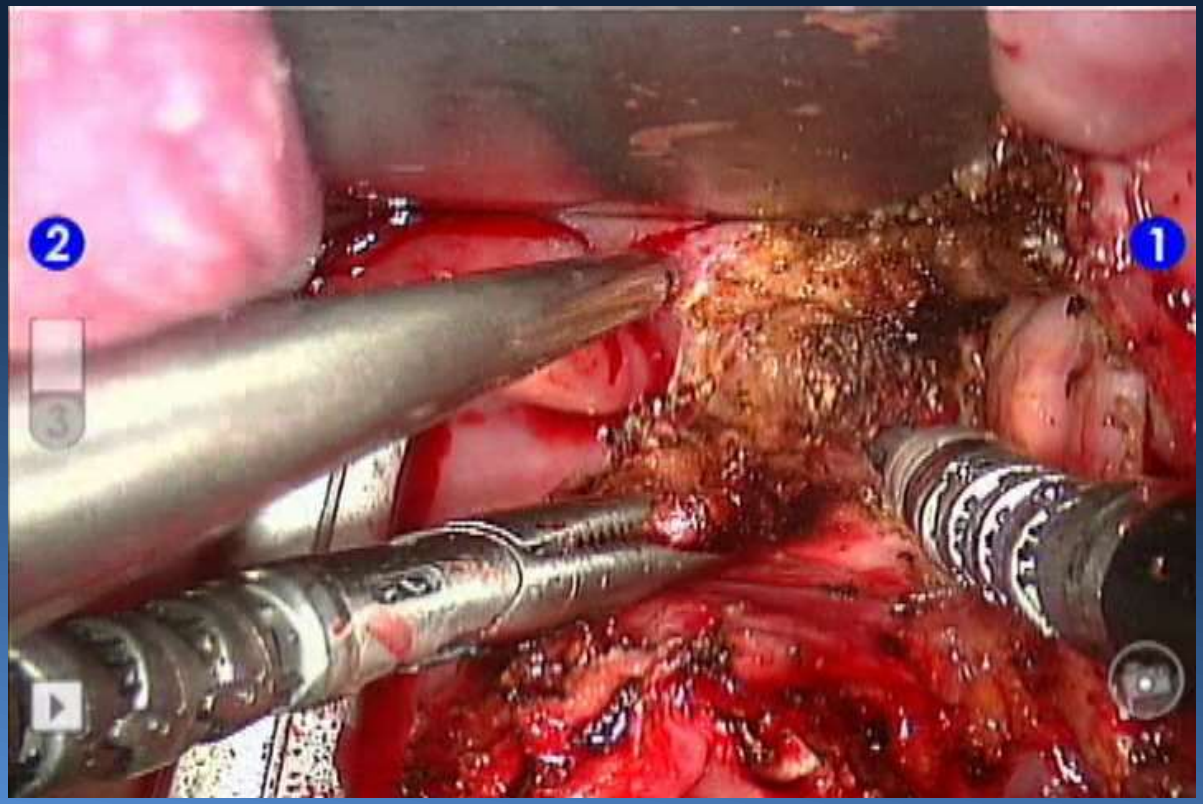
TransOral Robotic Surgery (TORS)

- What is it?
- Why do it?
- Which patients?
- How is it done?
- What are the risks?
- What are the outcomes?

TransOral Robotic Surgery (TORS)

Complications

TORS Complications
Bleeding



TORS Complications
Postoperative Bleeding Risk

- Incidence 1.5-13%
  - Prior radiation increases risk
  - Anticoagulation increases risk

	Postoperative Hemorrhage	No Postoperative Hemorrhage
Antithrombotic medication	8/48 = 17%	40/48 = 83%
No antithrombotic medication	3/99 = 3%	96/99 = 97%

[a]Relative risk = 5.5 (1.53, 19.81), P = .0057.

Asher S *et al*. *Otolaryngol Head Neck Surg* 2013

TORS Outcomes Survey
Postoperative Bleeding Risk

Table 6. Postoperative complications.

	Number of Incidences	% Total Cases
Total number of complications	205	10.1
Patient death after transoral robotic surgery (TORS)	7	0.3
Hemorrhage	62	3.1
Dehydration requiring readmission	26	1.3
Aspiration pneumonia	22	1.1
Airway obstruction	4	0.2
Inadvertent lingual nerve injury	11	0.6
Temporary (<2 mos) hypoglossal nerve injury	18	0.9
Prolonged (>2 mos) hypoglossal nerve injury	2	0.1
Tooth injury	29	1.4
Orocutaneous fistula	3	0.2
Prolonged (>6 mos) PEG tube dependency	21	1.0
# patients with prolonged PEG tube dependency and prior history of XRT	14	0.7

Chia S, Gross N, Richmon J. *Otolaryngol Head Neck Surg* 2013

TORS Complications
Postoperative Bleeding Severity

Table 1. Classification System for Postoperative Hemorrhage

Classification	Description
Normal	Patient noting the presence of blood-tinged mucus, flecks of blood, brown mucus, or red streaks
Minor	Any description of bright red blood or blood clots Resolved without operative management whether or not physician evaluation or hospitalization occurred.
Intermediate	Diffuse venous oozing or small arterial source bleeding resulting in operating room evaluation or intervention Managed with monopolar or bipolar cautery
Major	Brisk or copious bleeding requiring operative intervention Managed with transoral or transcervical vessel ligation, or interventional radiology embolization
Severe	Bleeding resulting in life-threatening medical complications such as: Hypoxia/airway compromise requiring tracheostomy Cardiopulmonary arrest Hemodynamic instability requiring blood transfusion

33/906=
3.6%

Pollei TR *et al*. *JAMA Otolaryngol* 2013

TORS Complications
Deaths

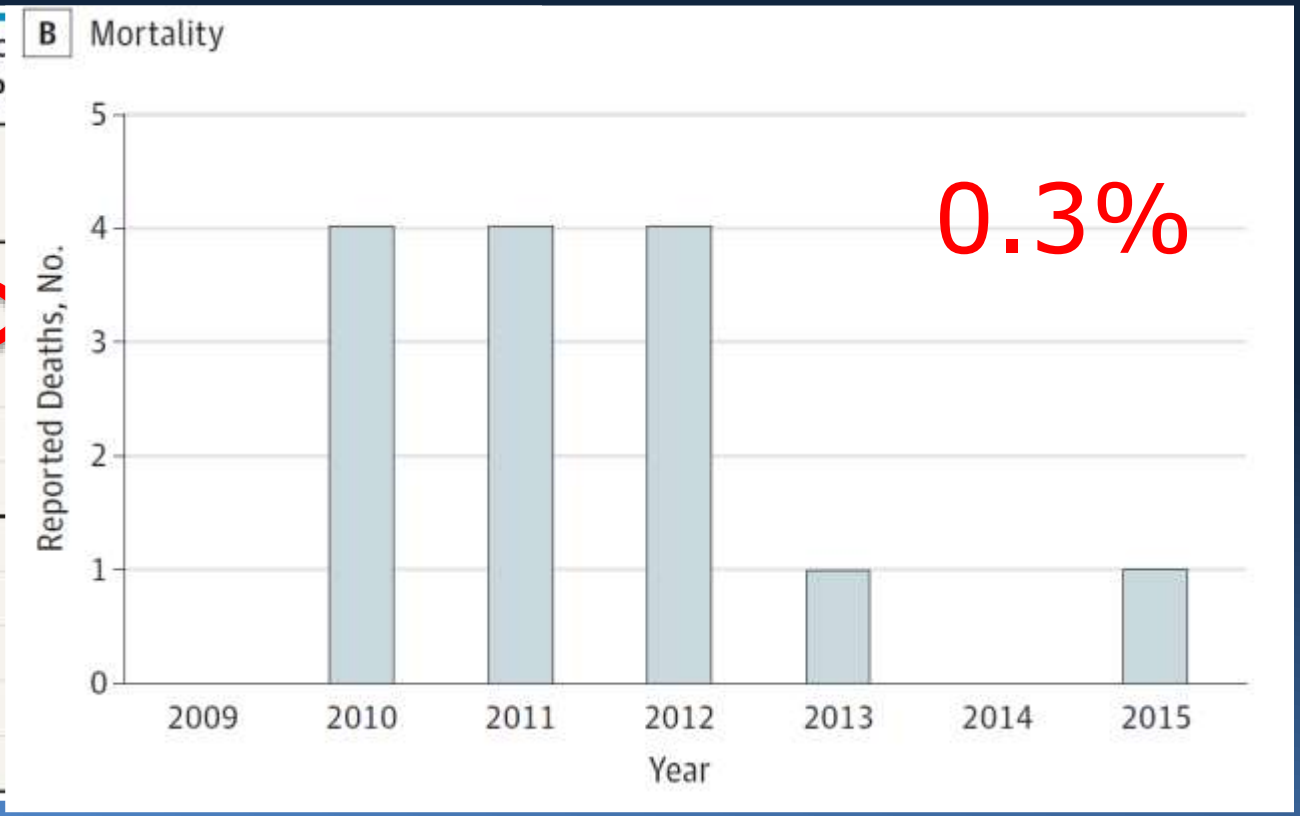
	No. (%) [95% Confidence Interval]						
	Gynecology	Urology	Cardiothoraci	Head & Neck	Colorectal	General	N/A
Overall [a]	3,194 (30.1) [29.2–31.0]	1,565 (14.7) [14.0–15.4]	393 (3.7) [3.3–4.1]	71 (0.7) [0.5–0.9]	301 (2.8) [2.5–3.1]	197 (1.9) [1.6–2.2]	4,903 (46.2) [45.3–47.1]
Event Type [b]							
Death	46 (1.4) [1.0–1.8]	30 (1.9) [1.2–2.6]	25 (6.4) [4.0–8.8]	14 (19.7) [10.4–29.0]	11 (3.7) [1.6–5.8]	11 (5.6) [2.4–8.8]	7 (0.1) [0.0–0.2]

Alemzadeh H *et al*. *PLOS One* 2016

TORS Complications
Bleeding Deaths

Table. Morbidity and Mortality Assoc
Surgical System in Otolaryngologic P

Etiology	Events, No. (%)
Death	
Bleeding	11 (79)
Unknown	2 (14)
Aspiration	1 (7)
Total	14
Injury	
Burns and trauma[a]	6 (55)
Bleeding	2 (18)
Other[b]	3 (27)
Total	11



Chen MM, Holsinger FC. *JAMA Otolaryngol* 2016

TORS Complications
Bleeding

PBS NEWSHOUR

THE RUNDOWN

A BLOG OF NEWS AND INSIGHT

HEALTH SUPREME COURT ELECTION 2016

HEALTH

Mishaps and deaths caused by surgical robots going underreported to FDA

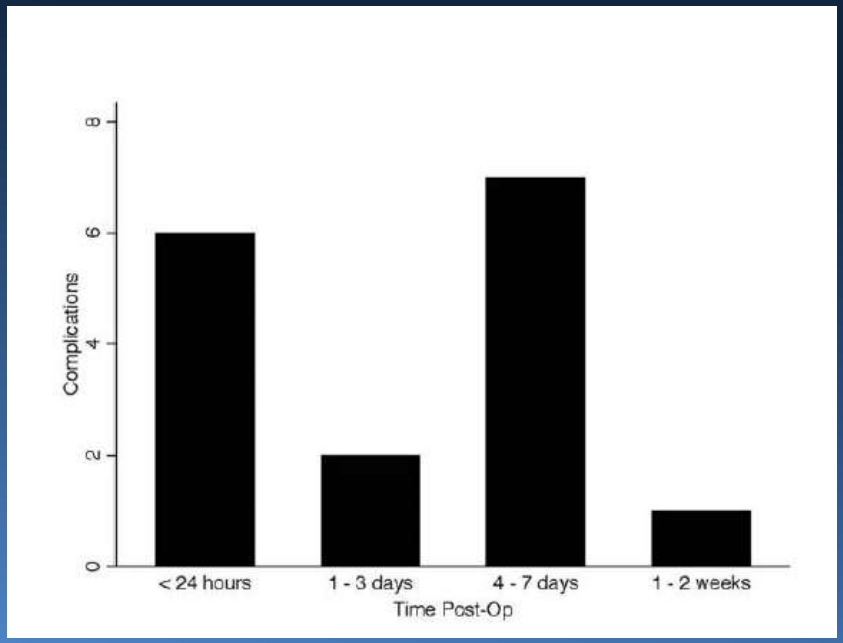
BY KAISER HEALTH NEWS AND MARISSA EVANS *November 1, 2013 at 11:31 AM EDT*

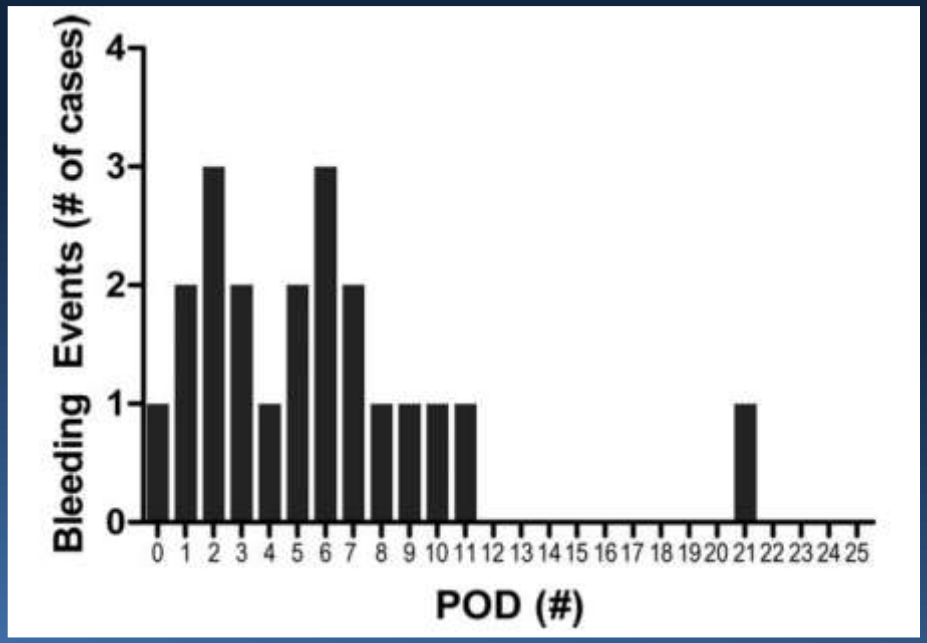
+1

EMAIL

2017

TORS Complications
Timing of Bleeding





Richmon J. *et al*. *Laryngoscope* 2014
Mandel R. *et al*. *Head Neck* 2015

Avoiding TORS Complications
ECA Ligation

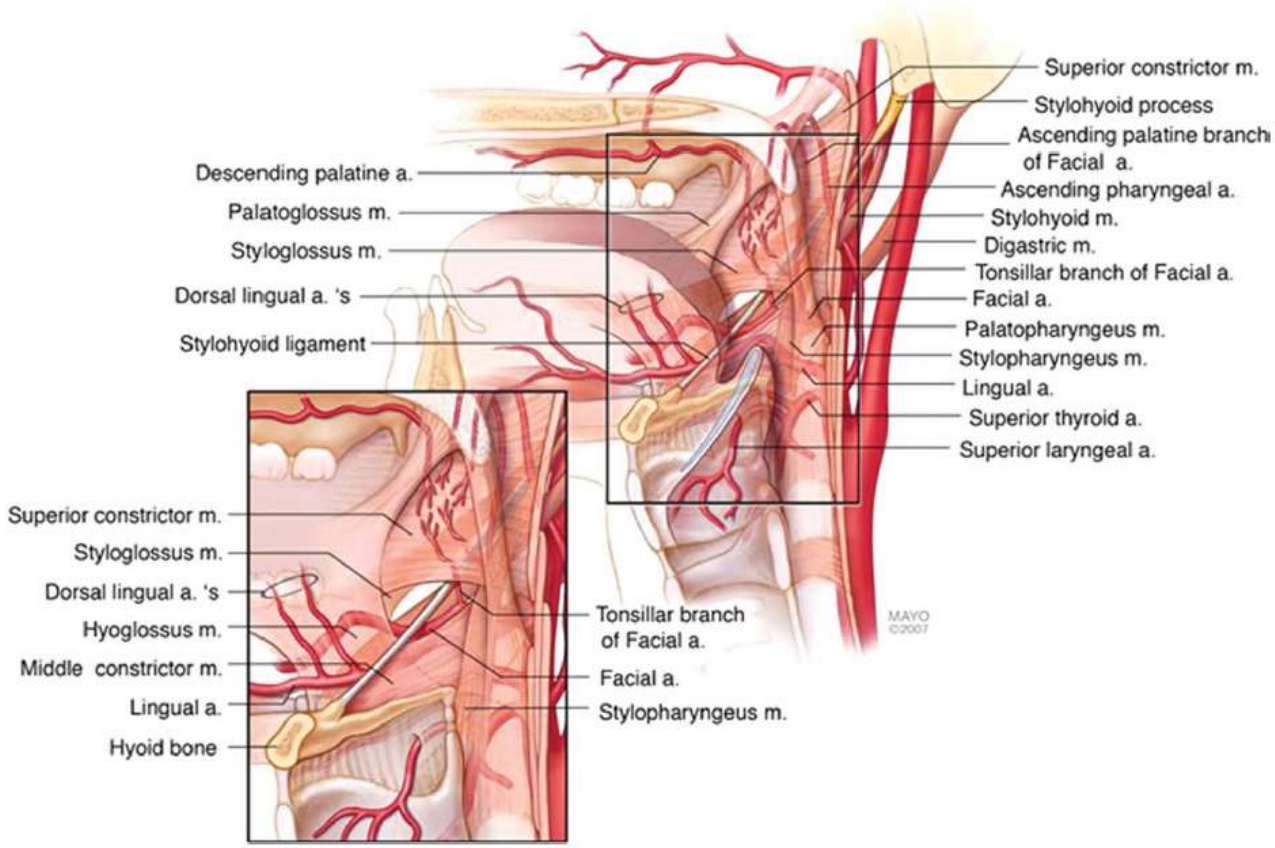
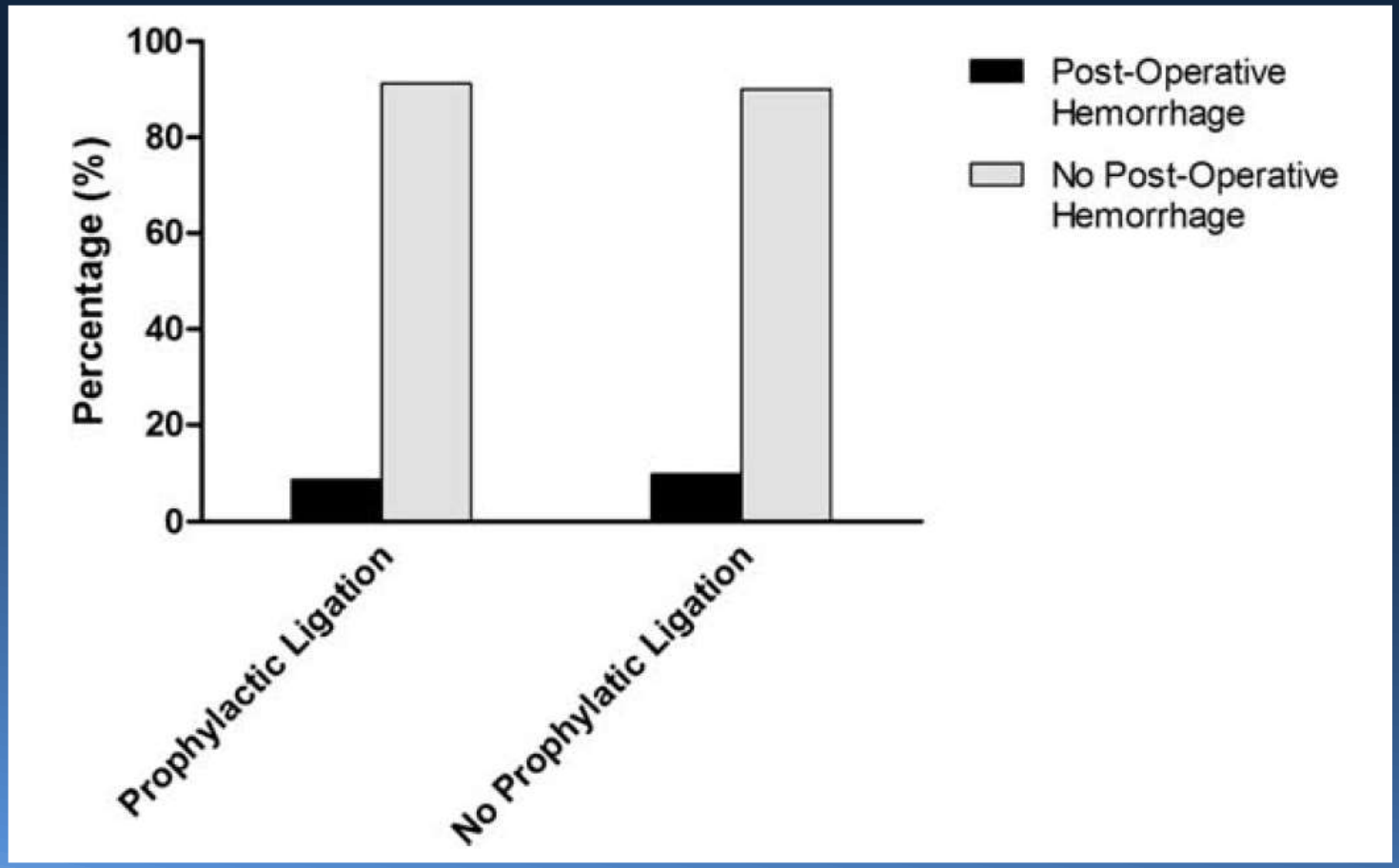


Fig. 3. Vessels and nerves of the lateral oropharynx and base of tongue.

Moore EJ *et al*. *Clin Anatomy* 2012

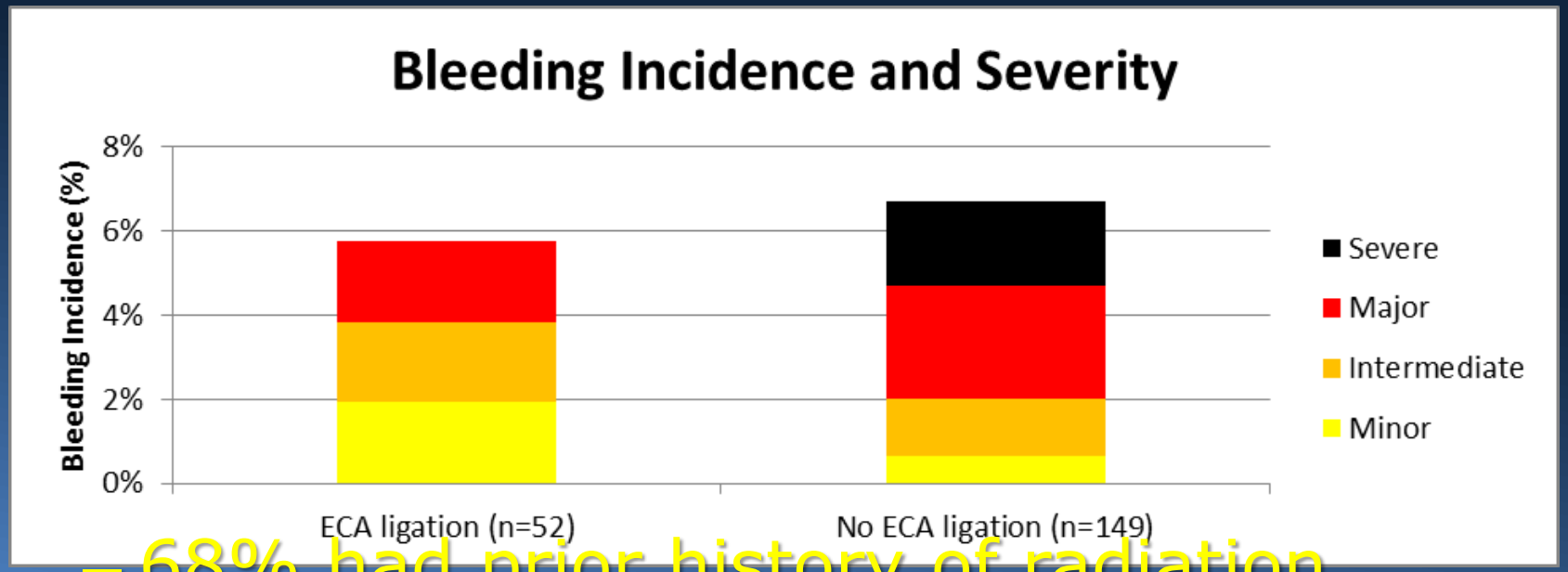
Avoiding TORS Complications
ECA Ligation



Mandel R. *et al*. *Head Neck* 2015

Perioperative Management
Bleeding

- 100% ECA Ligation

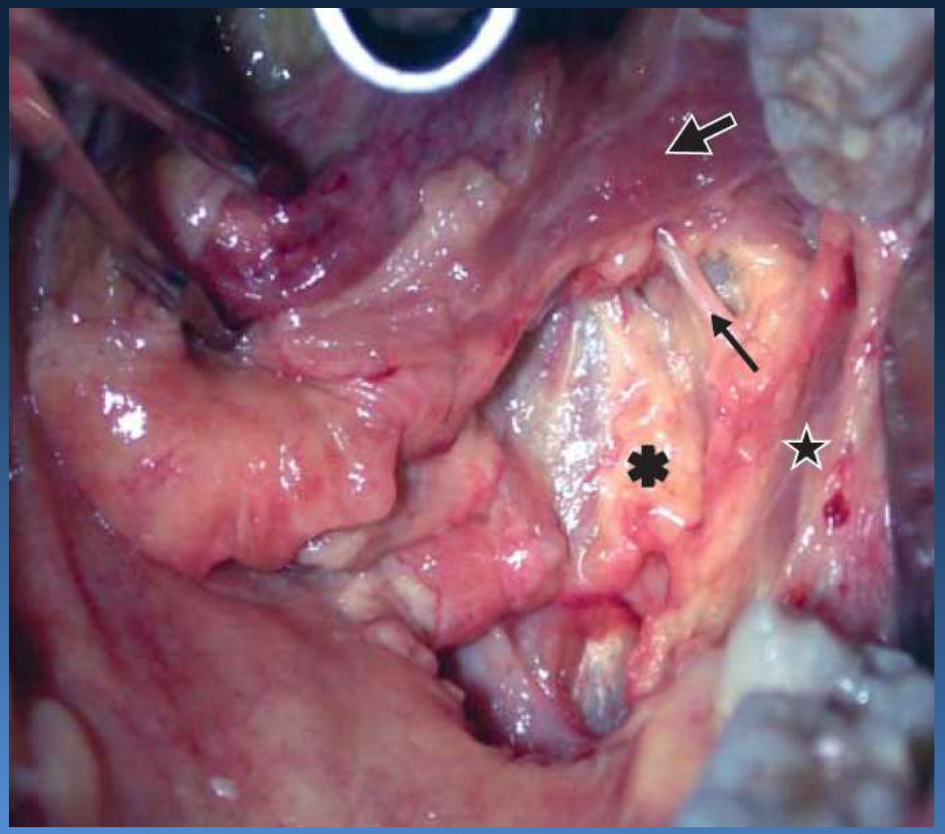


  - 68% had prior history of radiation, anticoagulation and/or within first 50 cases

Gleysteen *et al*. *Oral Oncology (submitted)*

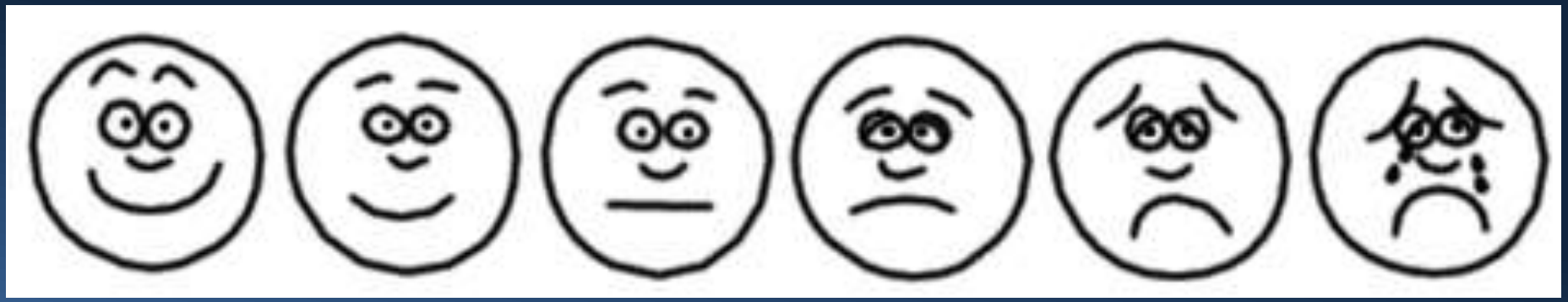
TORS Complications
Neurologic Injury

- Neuropraxia/ Neurolysis
  - Glossopharyngeal nerve
  - Lingual nerve
  - Hypoglossal nerve



Holsinger FC *et al*. *Arch Otolaryngol Head Neck Surg* 2005

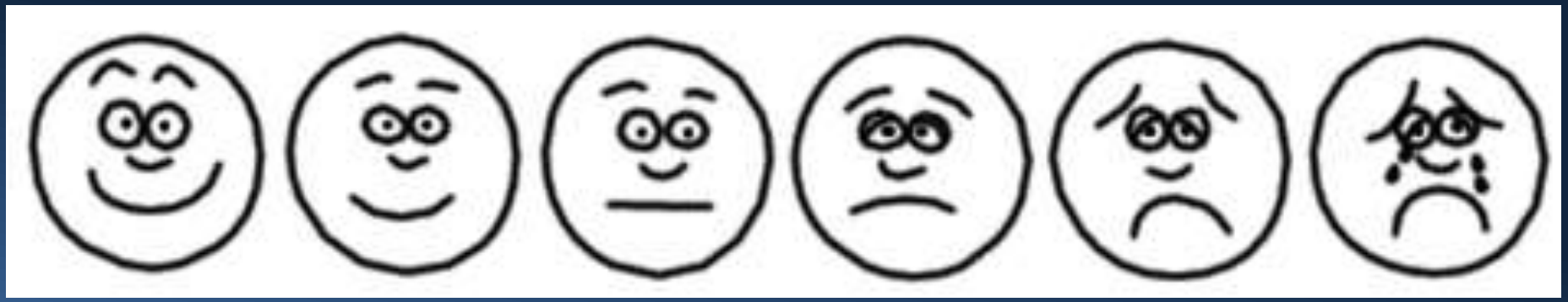
Perioperative Management
Pain



Week 1

LOS = 3-5 days

Perioperative Management
Pain



Week 2

Perioperative Management

Sequelae (expected events)	Complications (adverse events)
Dysphagia	Pneumonia
Pain	Dehydration

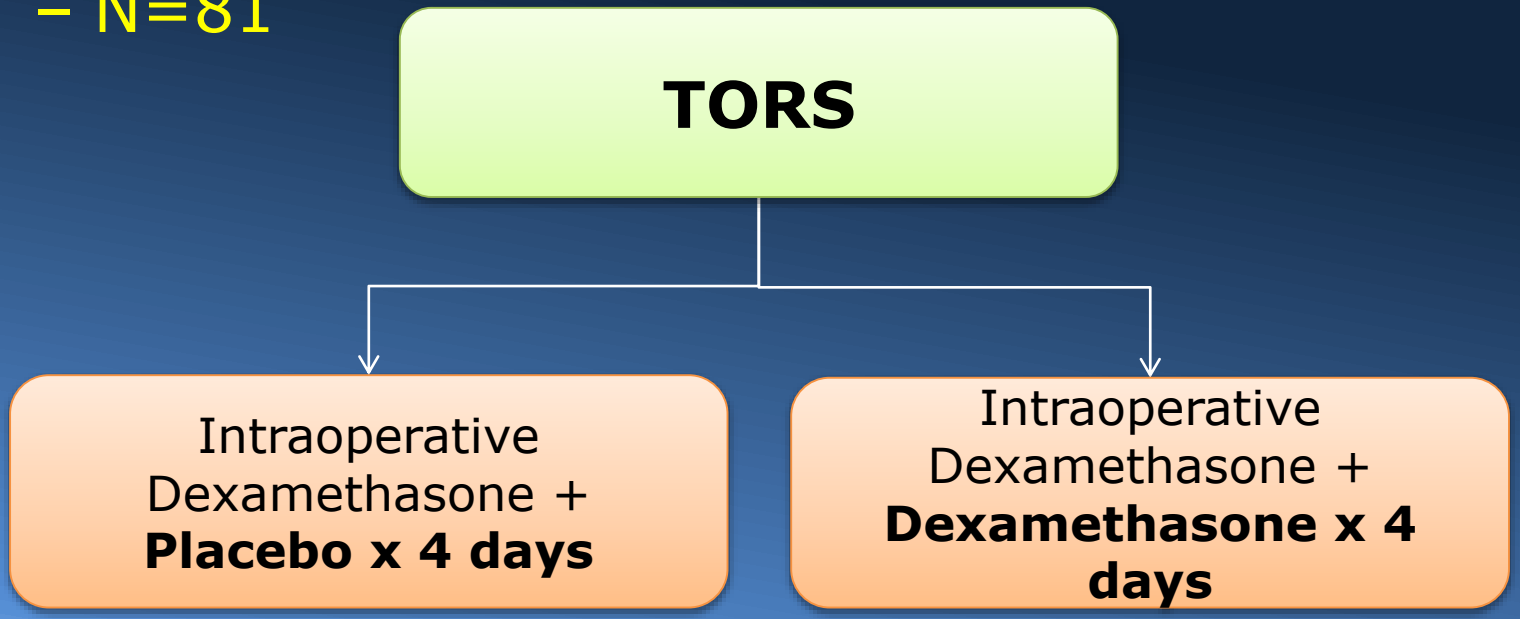
Perioperative Management

Another Instrument

Pain-Dysphagia

Prospective, Randomized, Placebo-Controlled, Double-Blinded Study

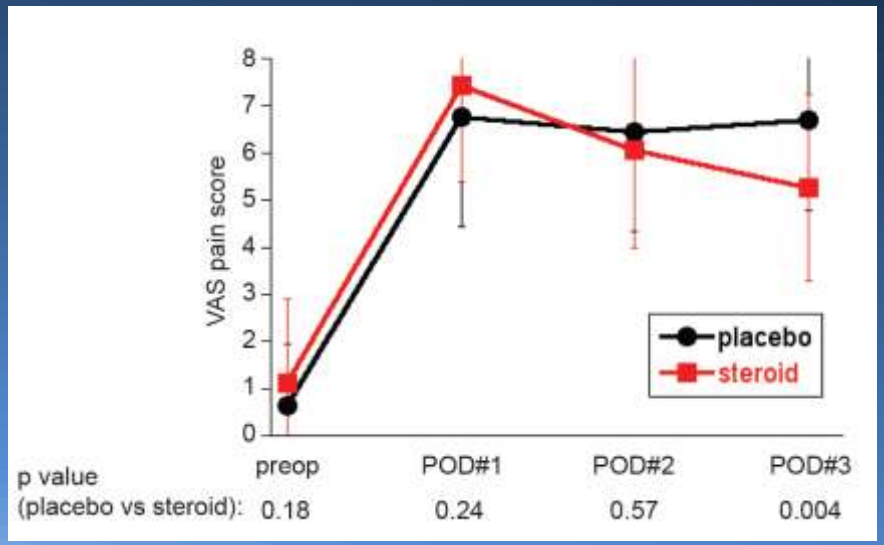
– N=81



Clayburgh *et al*. *Laryngoscope* (in press)

Perioperative Management
Pain-Dysphagia

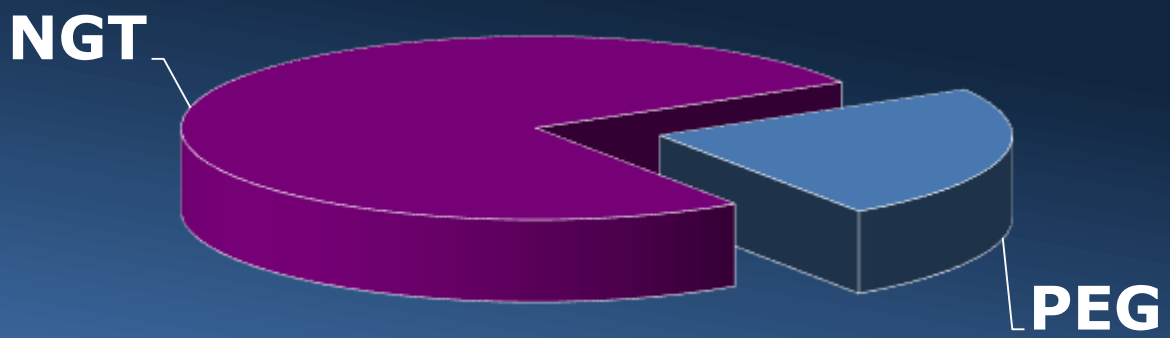
1. Decreased hospital LOS
   - (median: 4 v. 5 days, $p < 0.001$)
2. Improved diet consistency
   - (PSS POD 7-21: 51.7 v. 36.7, $p = 0.009$)



Clayburgh *et al*. *Laryngoscope* (in press)

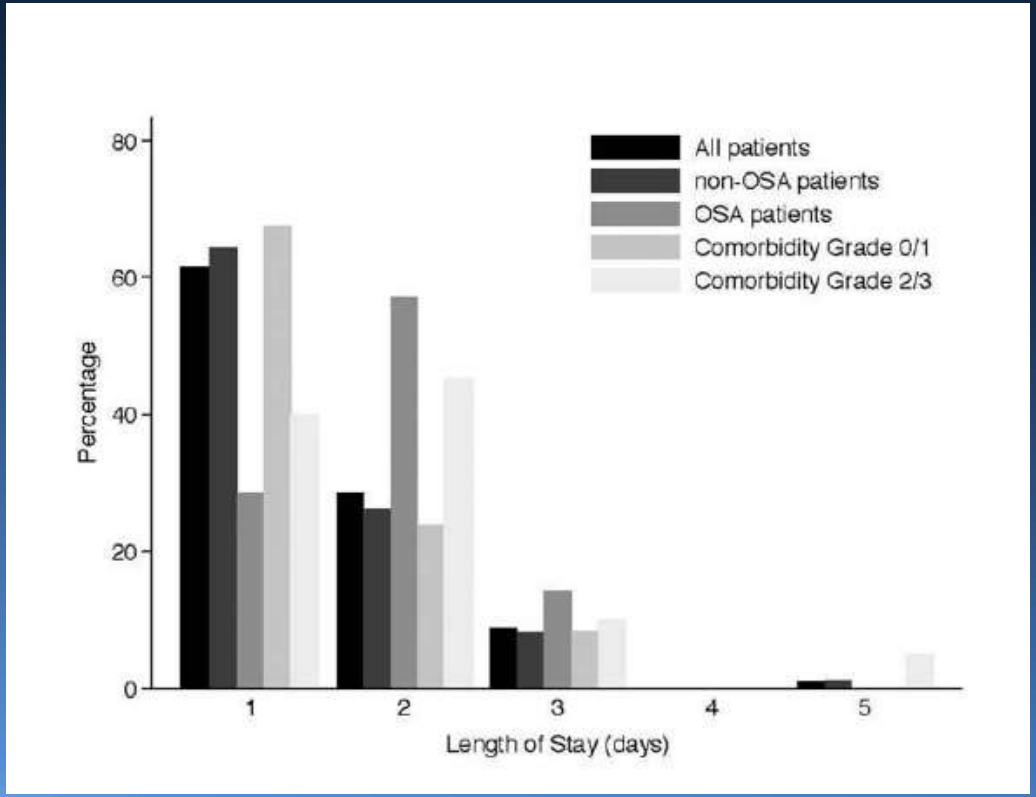
Perioperative Management
Pain-Dysphagia

- 100% feeding tube



Perioperative Management
Dysphagia

- Early discharge?



Richmon J. *et al*. *Laryngoscope* 2014

TransOral Robotic Surgery (TORS)

- What is it?
- Why do it?
- Which patients?
- How is it done?
- What are the risks?
- What are the outcomes?

TransOral Robotic Surgery (TORS)

What are the outcomes?

- Oncologic outcomes

Table 2
Transoral robotic surgery oncologic outcomes

Study	Patients T Stage	Human Papillomavirus+	Overall Survival (%)				Disease-Specific Survival (%)				Recurrence-Free Survival (%)			
			1 y	1.5 y	2 y	>	1 y	1.5 y	2 y	>	1 y	1.5 y	2 y	>
University of Alabama[21]	89 T 1–4										89		86	
University of Pennsylvania[28]	50 T 1–4	74	96		81		98		93					
Mount Sinai Medical Center[22]	30 T 1–2			90								78		
Ohio State University[23]	66 T 1–3	67				96 (3 y)				95 (3 y)				92 (3 y)
Mayo Clinic[25]	81 T 1–3	72							92	89 (4 y)				
Total	316	71												

2017 International Federation of Head and Neck Oncologic Societies

Brickman D, Gross N. *Otolaryngol Clin North Am* 2014

TransOral Robotic Surgery (TORS)

What are the outcomes?

Table 1. Patient and Tumor Characteristics (continued)

Characteristic	Value (N = 410)[a]
Multiple nodal positivity	
Yes	110 (26.8)
No	241 (58.8)
Unknown	59 (14.4)
Extracapsular spread	
Yes	58 (14.2)
No	100 (24.4)
Unknown	252 (61.5)
HPV status (229 patients tested)	
Negative	70 (17.1)
Positive	159 (38.8)
Unknown	181 (44.1)
p16 positivity (219 patients tested)	
Negative	61 (14.9)
Positive	158 (38.5)
Unknown	191 (46.6)
Neck dissection	
Yes	323 (78.8)
No	77 (18.8)
Unknown	10 (2.4)

Original Investigation

Oncologic Outcomes After Transoral Robotic Surgery
A Multi-institutional Study

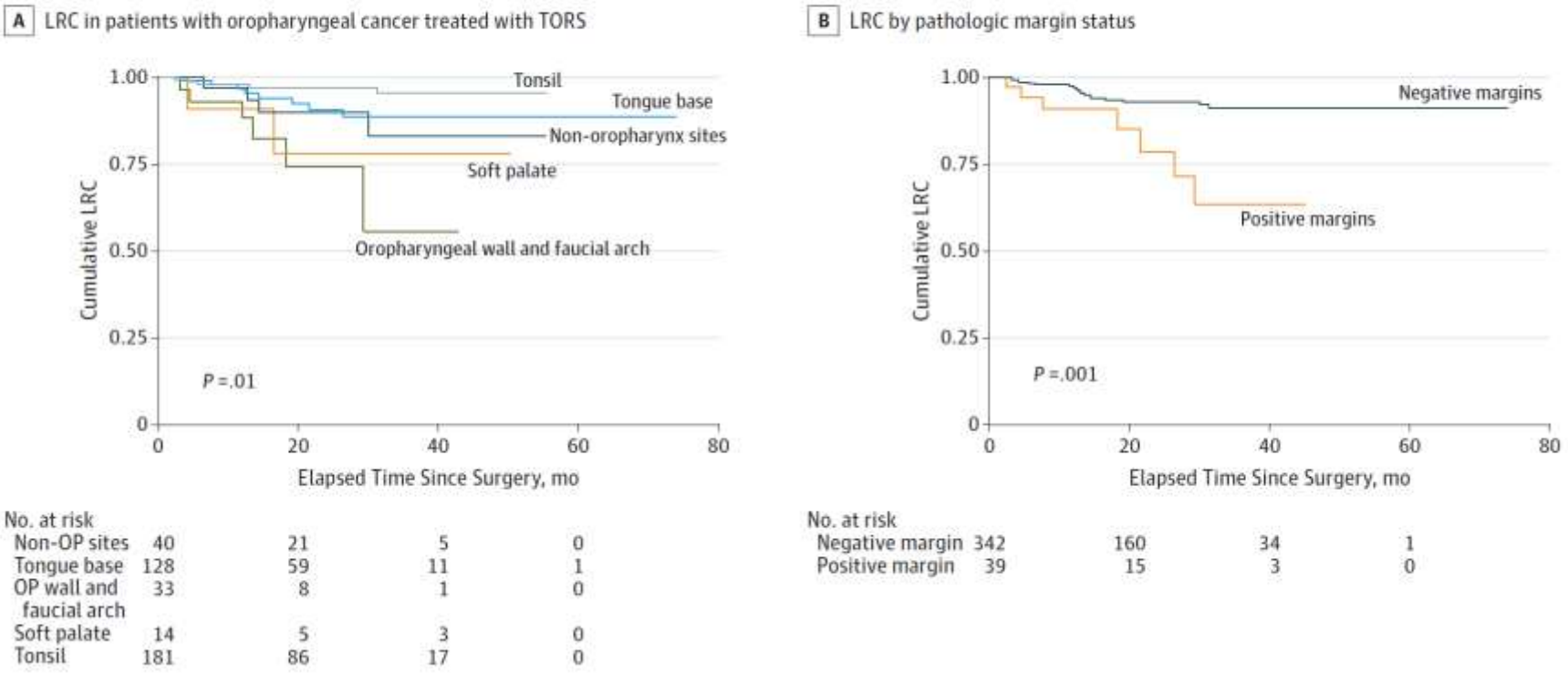
John R. de Almeida, MD, MSc; Ryan Li, MD; J. Scott Magnuson, MD; Richard V. Smith, MD; Eric Moore, MD; Georges Lawson, MD; Marc Remacle, MD; Ian Ganly, MD; Dennis H. Kraus, MD; Marita S. Teng, MD; Brett A. Miles, MD; Hilliary White, MD; Umamaheswar Duvvuri, MD, PhD; Robert L. Ferris, MD, PhD; Vikas Mehta, MD; Krista Kiyosaki, MD; Edward J. Damrose, MD; Steven J. Wang, MD; Michael E. Kupferman, MD; Yoon Woo Koh, MD; Eric M. Genden, MD; F. Christopher Holsinger, MD

Adjuvant treatment (338 patients)	
Radiotherapy	106 (25.9)
Chemoradiotherapy	72 (17.6)
No adjuvant treatment received	160 (39.0)
Unknown	72 (17.6)

TransOral Robotic Surgery (TORS)

What are the outcomes?

Figure 1. Locoregional Control (LRC) for Patients Treated With Transoral Robotic Surgery (TORS)



de Almeida et al. *JAMA Otolaryngol* 2015

TransOral Robotic Surgery (TORS)

What are the outcomes?

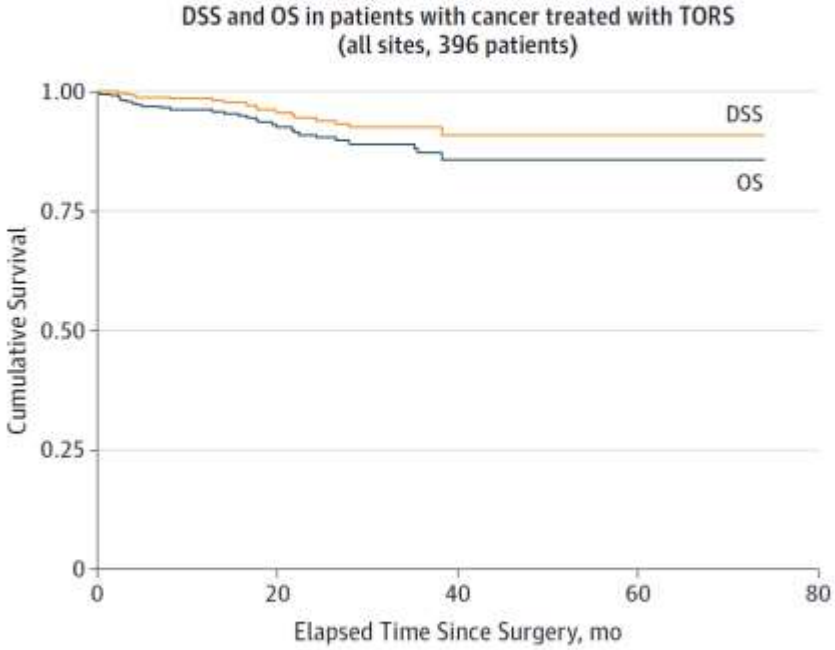
Table 3. Multivariate Analysis of Risk Factors for Locoregional Recurrence and All-Cause Mortality

Factor	HR (95% CI)	*P* Value[a]
Risk Factors for Locoregional Recurrence		
Age >60 y	2.49 (0.90-6.92)	.08
Smoking history	3.60 (0.81-15.9)	.09
Positive margins	2.43 (0.92-6.47)	.07
Tonsil primary site	0.28 (0.08-1.00)	.05
Oropharyngeal wall, faucial wall primary site	2.51 (0.87-7.28)	.09
Risk Factors for All-Cause Mortality		
Age >60 y	1.76 (0.79-3.96)	.17
Female sex	0.18 (0.02-0.[illegible])	.05
Smoking history	6.90 (1.57-28.9)	.01
Tonsil primary site	0.18 (0.07-0.65)	.01
Oropharyngeal wall, faucial wall primary site	0.91 (0.36-3.23)	.90
Tongue base primary site	0.53 (0.26-1.68)	.39

Abbreviation: HR, hazard ratio.

[a] Cox proportional hazards model.

Figure 2. Overall Survival (OS) and Disease-Specific Survival (DSS) for Patients Treated With Transoral Robotic Surgery (TORS)



Overall survival and DSS in all 396 study patients with head and neck cancer.

TransOral Robotic Surgery (TORS)

What are the outcomes?

- Functional outcomes

Table 1
Transoral robotic surgery functional outcomes

Study	Patients	Tumor Site(s) T Stage	Temporary/ Permanent Tracheostomy (%)	Oral Diet Only Within 6 wk (%)	Temporary/ Permanent Gastrostomy Tube (%)	Preoperative/1 mo After MDADI	Baseline/3 mo/ 12 mo HNQOL
University of Pennsylvania[20]	47	OP T 1–4	11/0		0/2		
University of Alabama[11,13,21]	89	OC, OP, L T 1–4	3/0	79	25/0	77/61	
Mount Sinai Medical Center[12,22]	30	OP, L T 1–2	13/0				76.3/61.2/76.8
Mayo Clinic[14,23,24]	66	OP T 1–3	26/2	97	27/5		
Ohio State University[25–27]	81	OP T 1–3		100	[illegible]		78.7/67.9/77.9
Total	313		13/1	92	18/4		

Brickman D, Gross N. *Otolaryngol Clin North Am* 2014

TransOral Robotic Surgery (TORS)

Functional Outcomes Study

METHODS

- Single-institution retrospective study at MDACC
- Dual TORS and radiation databases merged
- IRB approved

Surgical group	Non-surgical group
• TORS +/- adjuvant • 2010-15	• Radiation +/- systemic • 2010-12

Inclusion criteria	Exclusion criteria
• Previously untreated HPV+ OPSCC • T1-2 • N0-2b • M0 • Tonsil or base of tongue	• G-tube dependence at initiation of treatment • Prophylactically placed G-tube

TransOral Robotic Surgery (TORS)

Functional Outcomes Study

METHODS

- Outcome Measures
  1. Weight loss
     - Δ Weight (baseline to >90 days post treatment)

Grade		
1	2	3
5% to <10% from baseline	10% to <20% from baseline; nutritional support indicated	≥20% from baseline; tube feeding or TPN indicated

TransOral Robotic Surgery (TORS)

Functional Outcomes Study

METHODS

- Outcome Measures

1. Weight loss

  - Δ Weight (baseline to >90 days post treatment)
  - CTCAE v.4.03

2. Gastrostomy tube placement

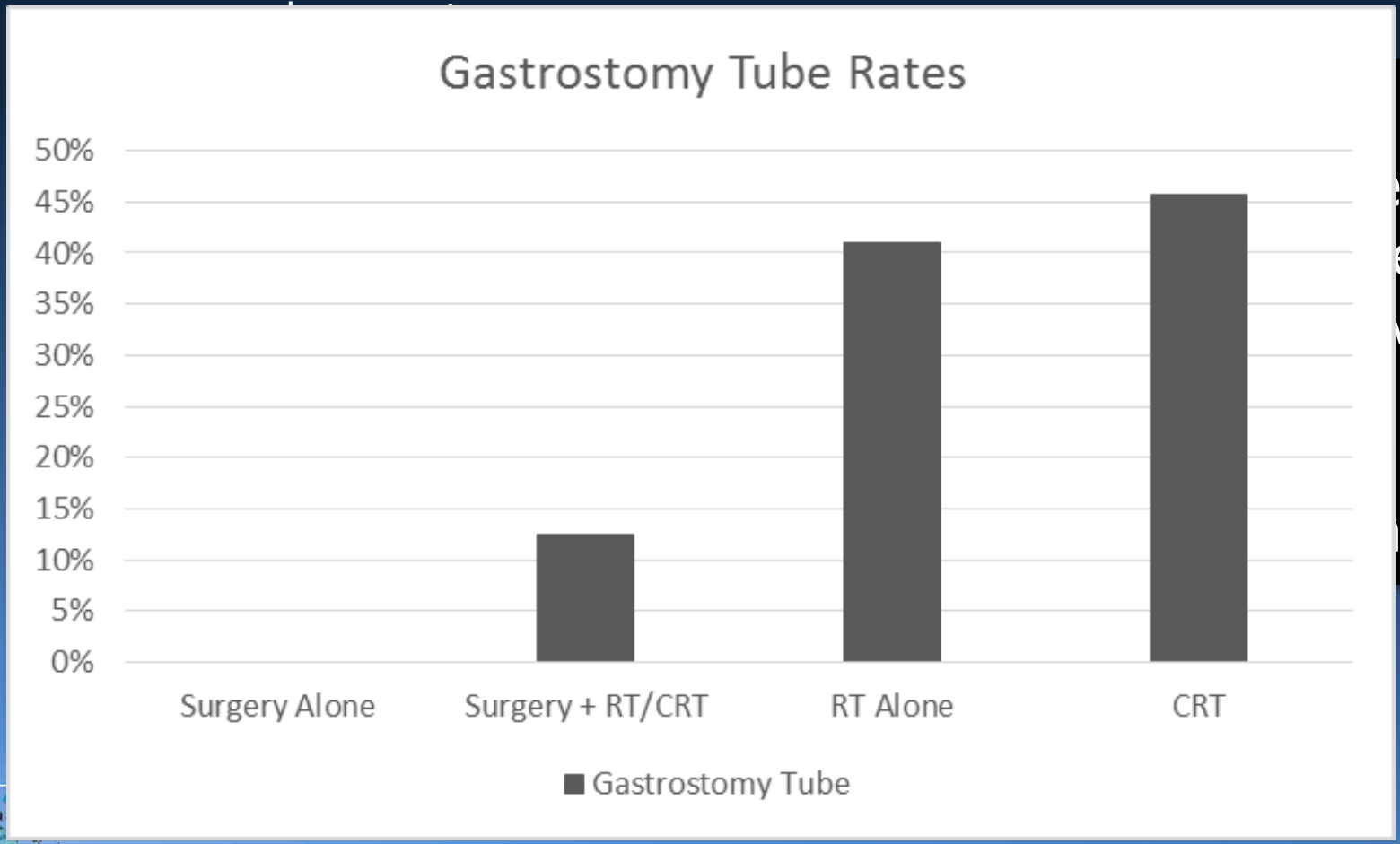
  - Incidence (baseline to 90 days post treatment)

TransOral Robotic Surgery (TORS)

Functional Outcomes Study

RESULTS

Incidence of gastrostomy tube



50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%

Surgical Non-surgical

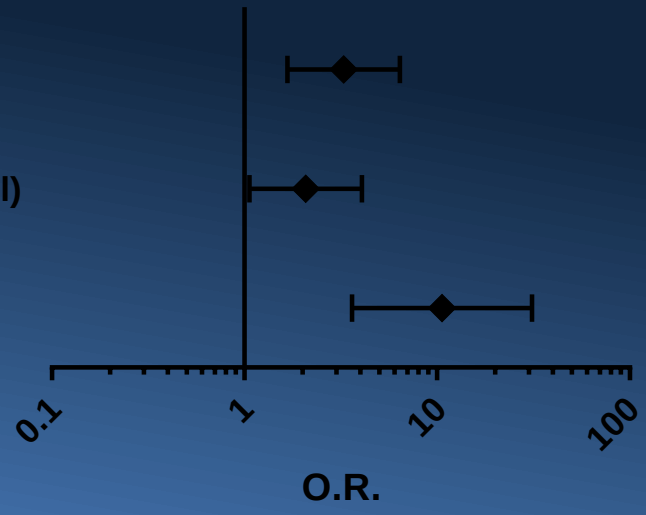
TransOral Robotic Surgery (TORS)

Functional Outcomes Study

RESULTS

Multivariable model showing Odds Ratio of Gastrostomy Tube placement

Multivariable Model Covariate	OR (95% CI)	*p* value
T-stage	3.27 (1.67-6.41)	0.001
Primary subsite (Tongue base vs. Tonsil)	2.08 (1.06-4.07)	0.032
Non-Surgical vs. Surgical	10.6 (3.61-31.13)	<0.001



OR = Odds Ratio
CI = Confidence Interval

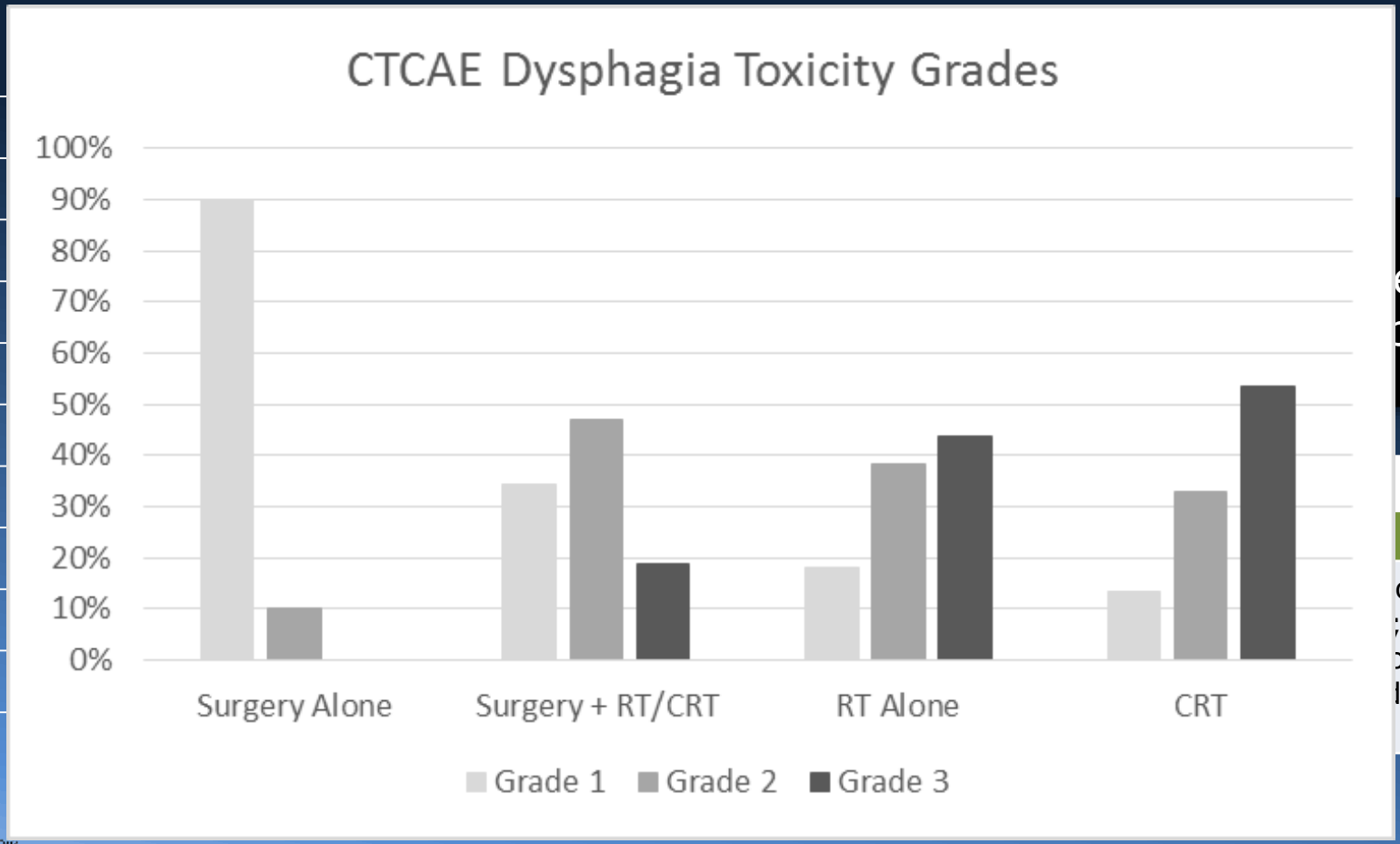
Patients treated non-surgically were 10.6x more likely to have a G-tube placed

2017

TransOral Robotic Surgery (TORS)

Functional Outcomes Study

RESULTS

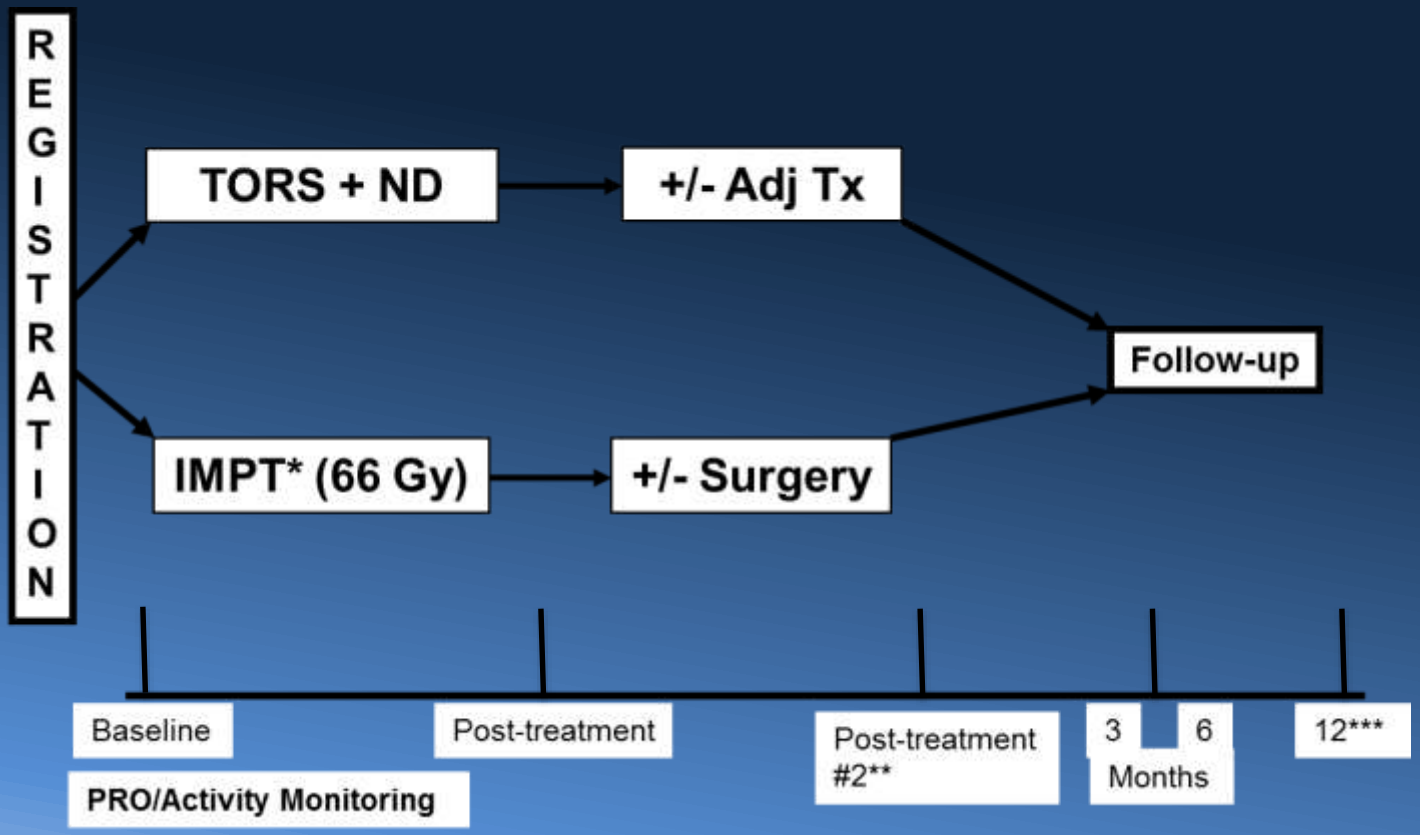


CTCAE = Common Terminology Criteria for Adverse Events ; TPN = Total parenteral nutrition

TransOral Robotic Surgery (TORS)

What are the outcomes?

- MDACC "Fitbit" study



2017

TransOral Robotic Surgery (TORS)
Summary

- HPV is changing the face of head and neck cancer
  - New approaches warranted
- TORS is a technique to reduce long-term toxicity via more tailored application of therapies

TransOral Robotic Surgery (TORS)
Summary

- Technique matters
  - Steep learning curve
  - Attention to perioperative management can minimize risks
- Oncologic and functional outcomes are promising
  - Rigorous outcomes data and clinical trials are still needed

Questions

ngross@mdanderson.org
@DrNeilGross

https://www.mdanderson.org/publications/cancerwise/2016/06/tonsil-cancer-surviv.html