A Commonsense Approach to Pediatric Aspiration:

With a focus on Clefts

Steven E. Sobol MD, MSc, FRCS(C), FAAP

Professor, Director of Program Integration

Department of Otorhinolaryngology-Head and Neck Surgery

Associate Surgical Director, CHOP King of Prussia Campus

Children's Hospital of Philadelphia
Penn Medicine

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Objectives

- Creating a systematic approach
  - Define the population that you are best suited to manage
- Explore the diagnosis and management of LTEC
  - The good
  - The bad
  - The ugly

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Definitions

- Dysphagia
  - ANY disorder, impairment or variation from norm during the oral, pharyngeal, or esophageal phases of swallow
- Aspiration
  - Secretions, food, or liquid entering the larynx and falling below the level of the vocal cords
  - "Silent" when it does not elicit a cough reflex

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Who do you want to be?

- Consider how you brand yourself
  - Highlight unique aspects of care that can be provided by an otolaryngologist
- Consider the type of pathology that you want to attract
  - As ENT surgeons, we have a specific skill set
  - Slippery slope between being effective and overwhelmed

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Who do you want to be???

- Pediatric Therapeutic Surgical Dysphagia Clinic

"PTSD Clinic"

- Surgical Treatment of Dysphagia Clinic

"STD Clinic"

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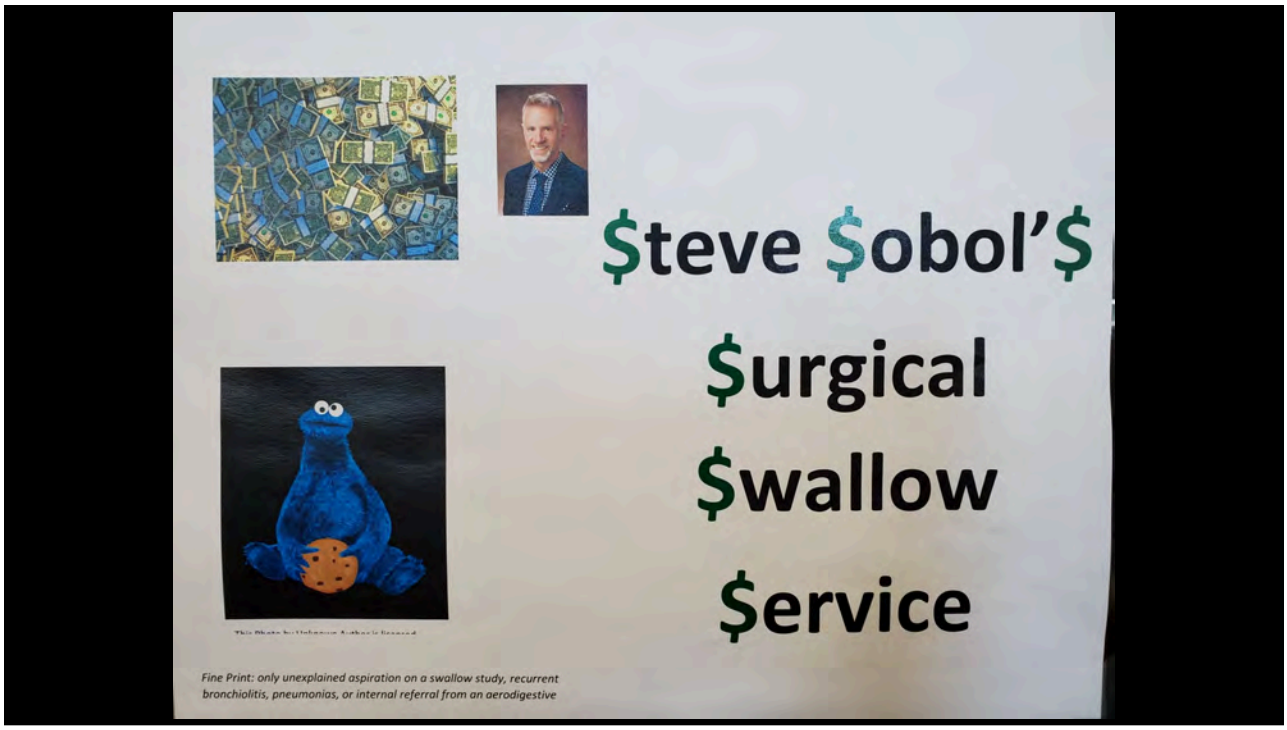

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Algorithm for Triage

- When we started
  - Word quickly spread…
    - Many referrals for any dysphagia issue
    - Self referrals from families fed up with their child's feeding problem that was "still not fixed"
    - All of a sudden, every aspirating patient was sent to us to "rule out a cleft"
    - Wait times for new patients became unacceptable (by American standards)

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Algorithm for Triage

- Our Aerodigestive Center
  - Six ENT Surgeons
    - We all see some dysphagia
    - One surgeon (me) who takes on the majority of complex cases
  - One multidisciplinary clinic/month
    - Maximum of 3 patients/hour
    - 20-25 patients per month
  - Each clinic slot is very valuable

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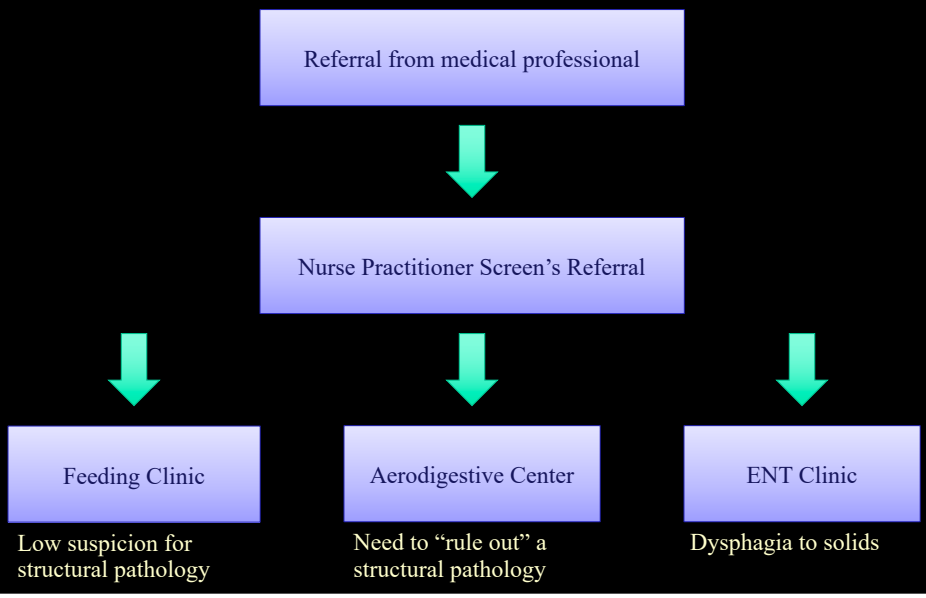
Algorithm for Triage



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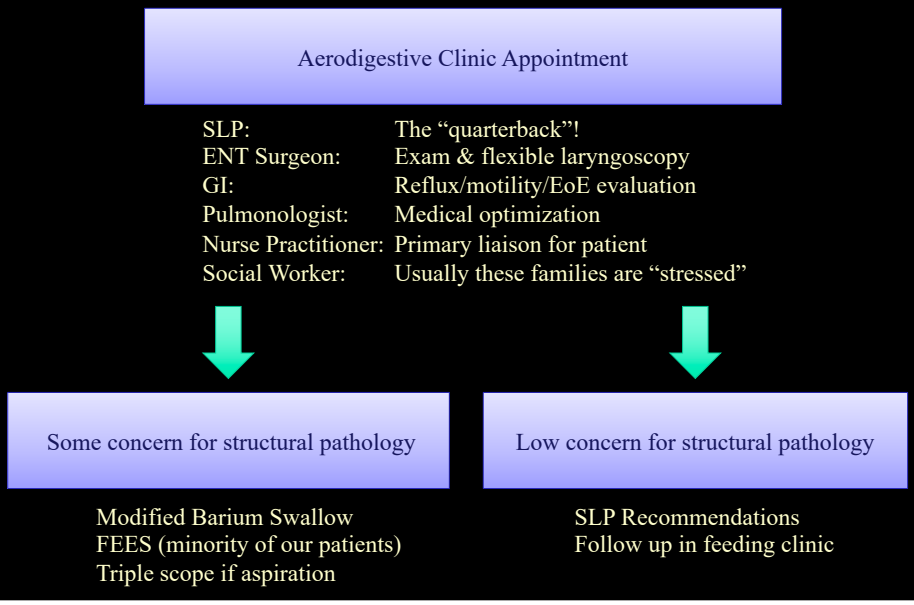
Algorithm for Triage



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Algorithm for Triage

- But this didn't work….
  - Too many false negatives since screening did not include confirmed (or high suspicion for) aspiration
  - Too many "soft referrals" to "rule out a cleft"
- Current criteria to be seen
  - Confirmed unexplained aspiration
  - Recurrent unexplained respiratory illness
  - Genetic/Syndromic diagnosis with midline defects
  - Direct referral from aerodigestive provider

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Algorithm for Triage

Confirmed unexplained aspiration or recurrent respiratory illness, genetic predisposition for midline defects, referral from aerodigestive provider

SLP:	The "quarterback"!
ENT Surgeon:	Exam & ??? flexible laryngoscopy
GI:	Reflux/motility/EoE evaluation
Pulmonologist:	Medical optimization
Nurse Practitioner:	Primary liaison for patient
Social Worker:	Usually these families are "stressed"

Confirmed concern for structural pathology and optimized

TRIPLE SCOPE

Low concern for structural pathology or not optimized

Medical optimization and F/U
Possible repeat MBSS
Follow up in feeding clinic

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DO

- Collaborate with a medical team
  - Pre-intervention for optimization
  - Post-intervention for continued rehabilitation of the swallow
- Have a defined pathway that will guide surgical candidacy
  - Not every patient needs a "triple scope"

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DON'T

- Make your clinic a "free for all"
  - Your clinic is a limited and precious resource
- Take on pathologies better served in a medical home
  - Many (most) dysphagia patients do not have surgically-amenable pathology
  - Try to limit focus to "aspiration" patients

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DON'T

- ??? Flexible scope every patient
  - We used to do this (pre-COVID)
  - Doesn't add much for the vast majority
  - We look at dynamics anyhow at the time of triple scope
  - We are currently much more selective about doing office scopes

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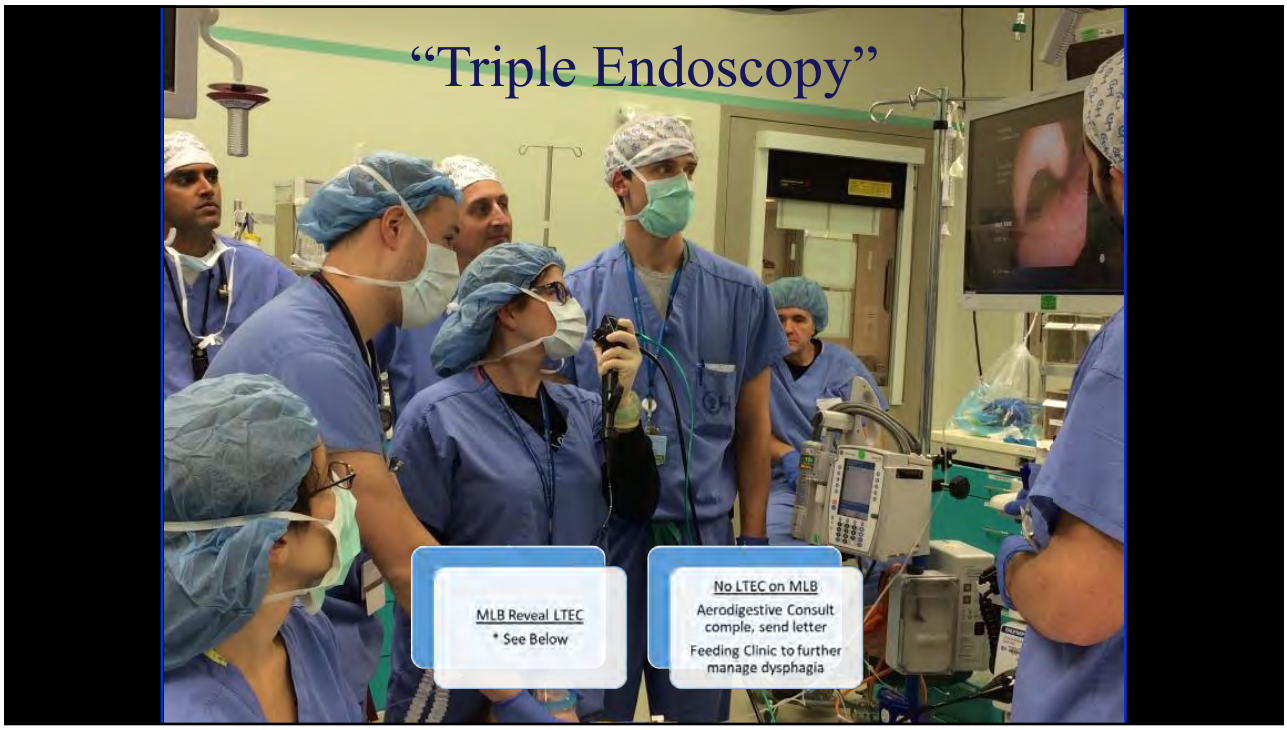
"Triple Endoscopy"
MLB Reveal LTEC
* See Below
No LTEC on MLB
Aerodigestive Consult comple, send letter
Feeding Clinic to further manage dysphagia

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Historic view of a "Team" meeting*
*Taken from the Archives of Medicine, circa 2019

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Laryngotracheoesophageal Clefts (LTEC)

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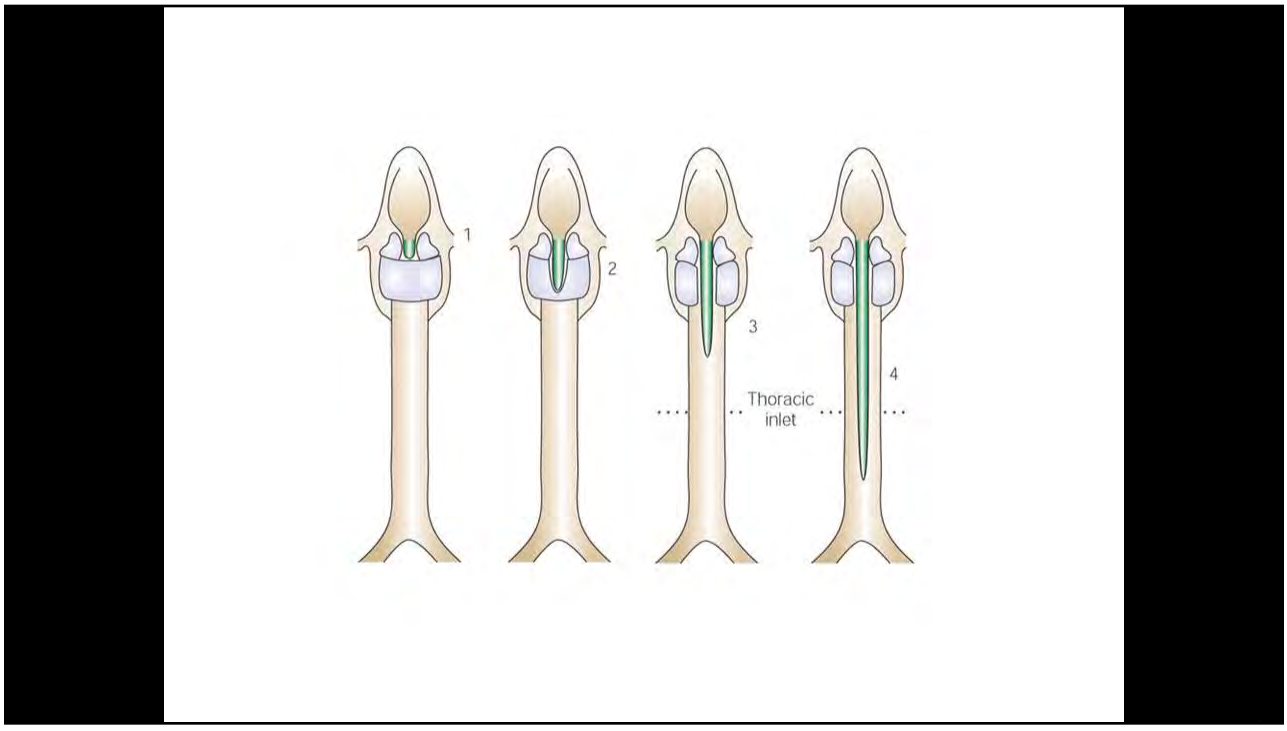
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2
3
4
Thoracic
inlet

20

Laryngotracheoesophagealclefts

- Presentation
  - Type I/II: Cough with feeds, Feeding issues, URI symptoms, recurrent pneumonias
  - Type III: Above +/- Stridor, raspy cry, frank distress, completely unable to PO feed
  - Type IV: Distress++, Difficulty maintaining intubation
  - Other midline anomalies or genetic syndrome
  - Associated TEF in about 1/3 of patients

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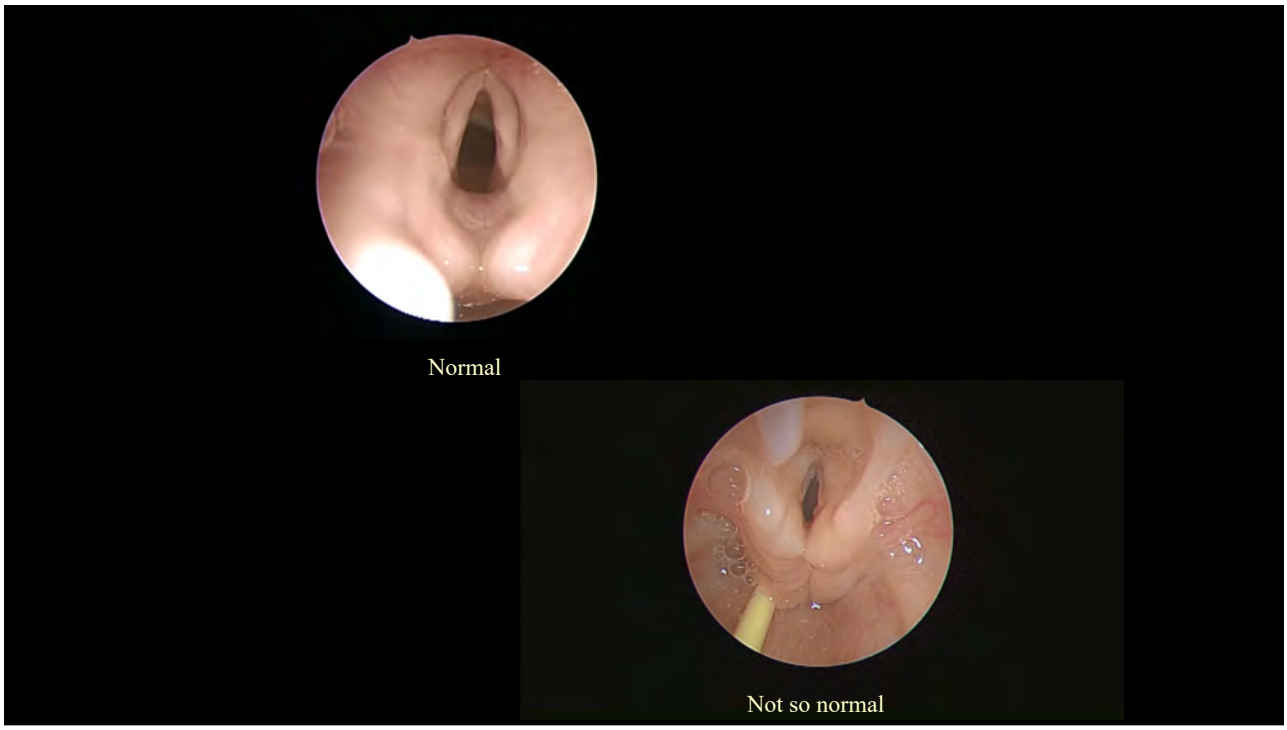

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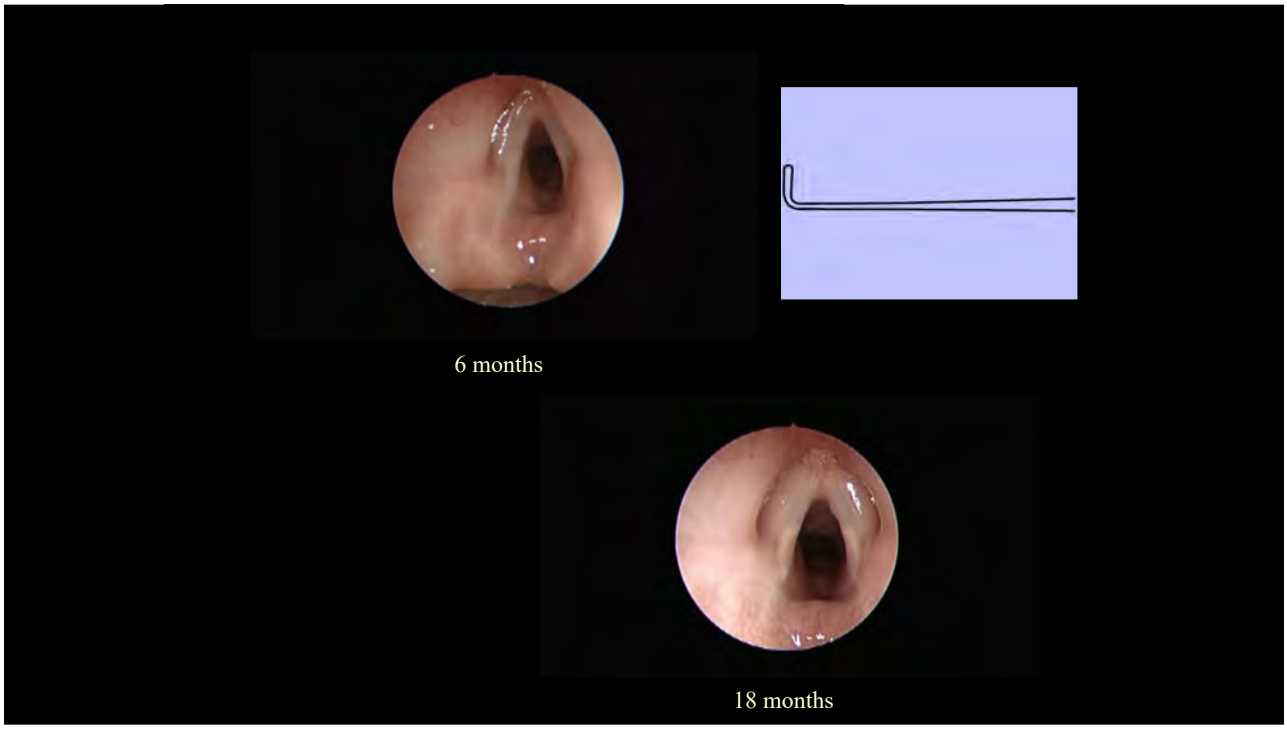

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- Is the ”Type I Cleft” to the airway surgeon what the “Posterior Tongue Tie” is to the dentist?

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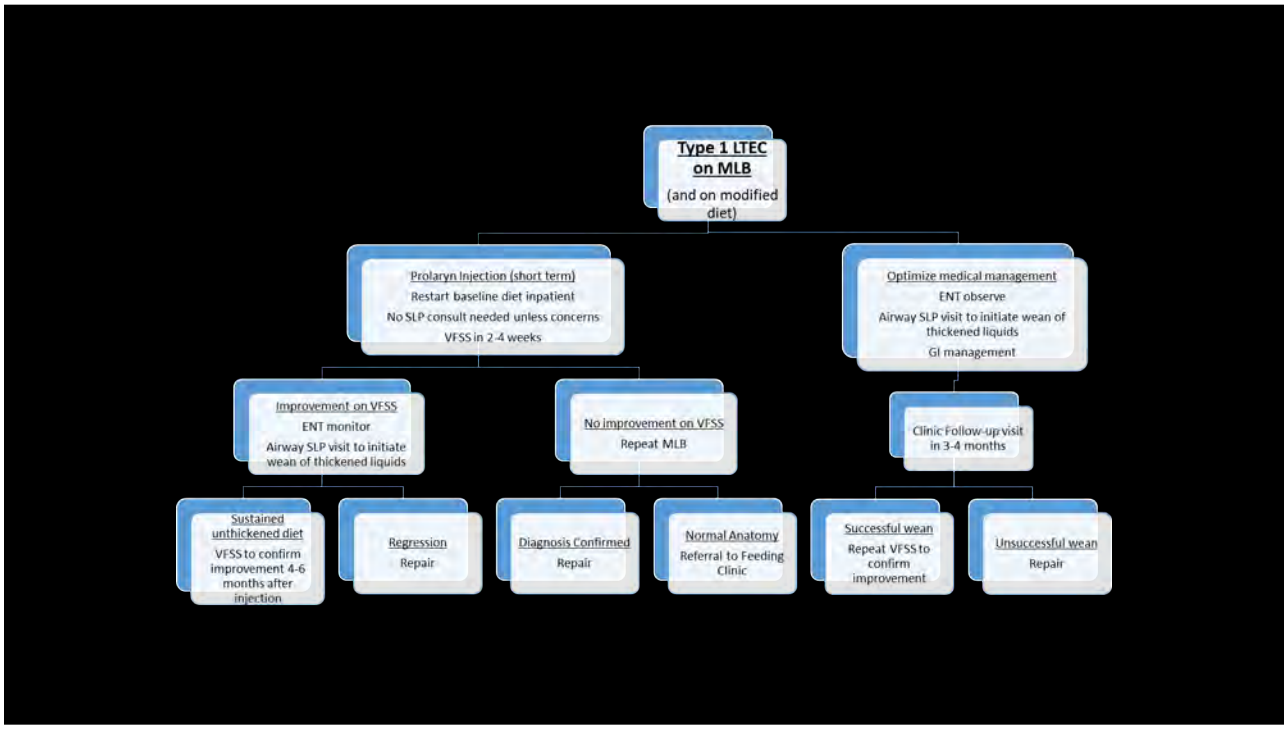

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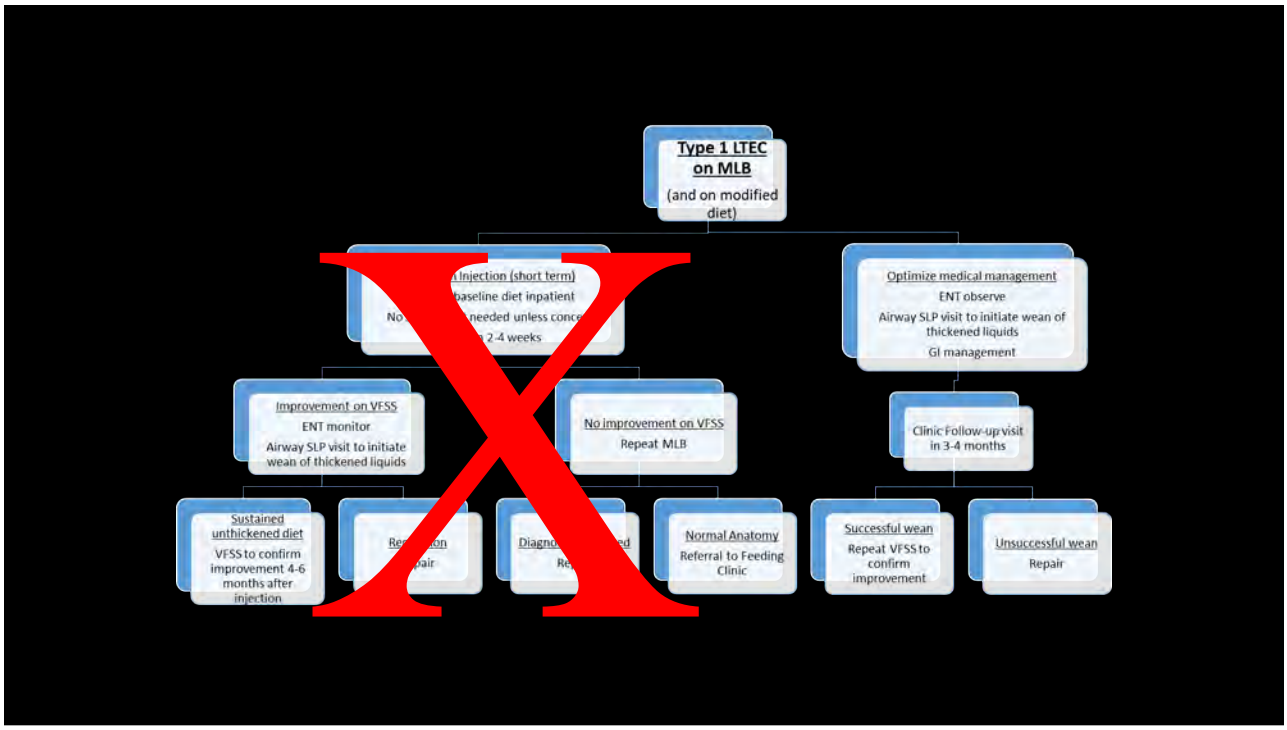
Type 1 LTEC on MLB
(and on modified diet)
Injection (short term)
baseline diet inpatient
needed unless conce
2-4 weeks
Optimize medical management
ENT observe
Airway SLP visit to initiate wean of thickened liquids
GI management
Improvement on VFSS
ENT monitor
Airway SLP visit to initiate wean of thickened liquids
No improvement on VFSS
Repeat MLB
Clinic Follow-up visit in 3-4 months
Sustained unthickened diet
VFSS to confirm improvement 4-6 months after injection
Normal Anatomy
Referral to Feeding Clinic
Successful wean
Repeat VFSS to confirm improvement
Unsuccessful wean
Repair

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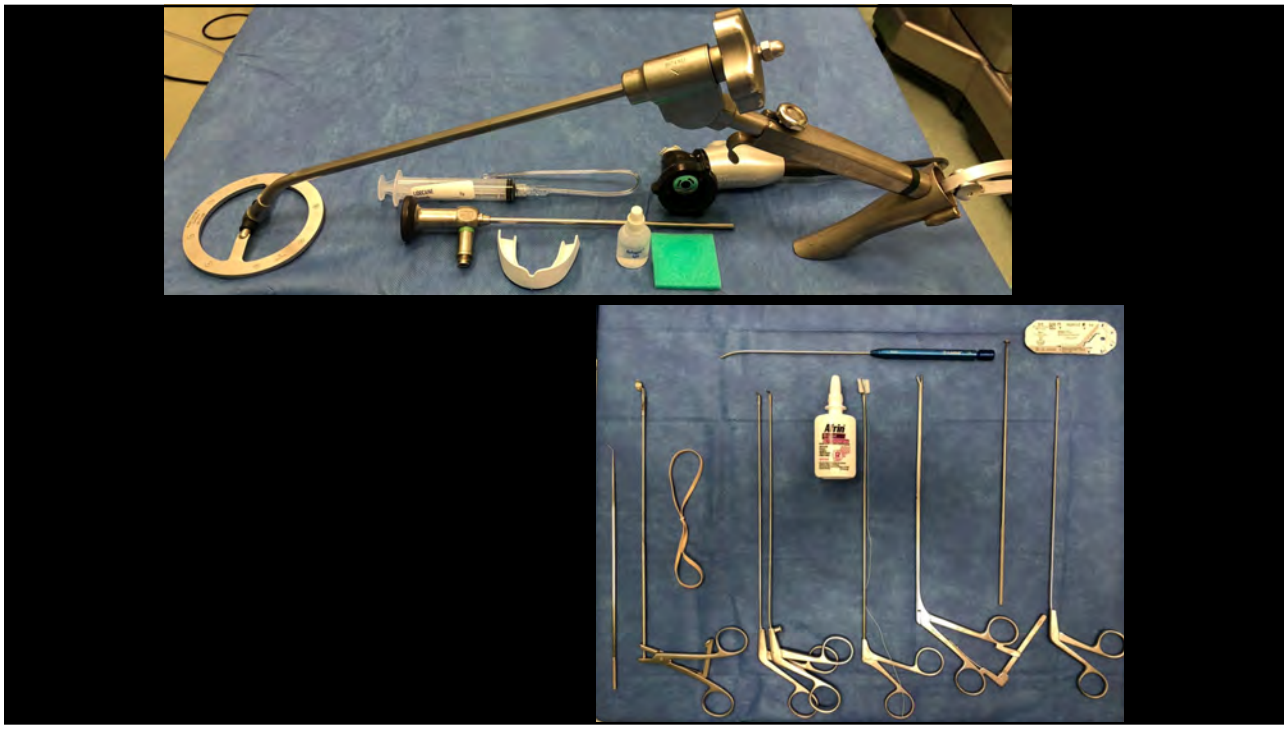

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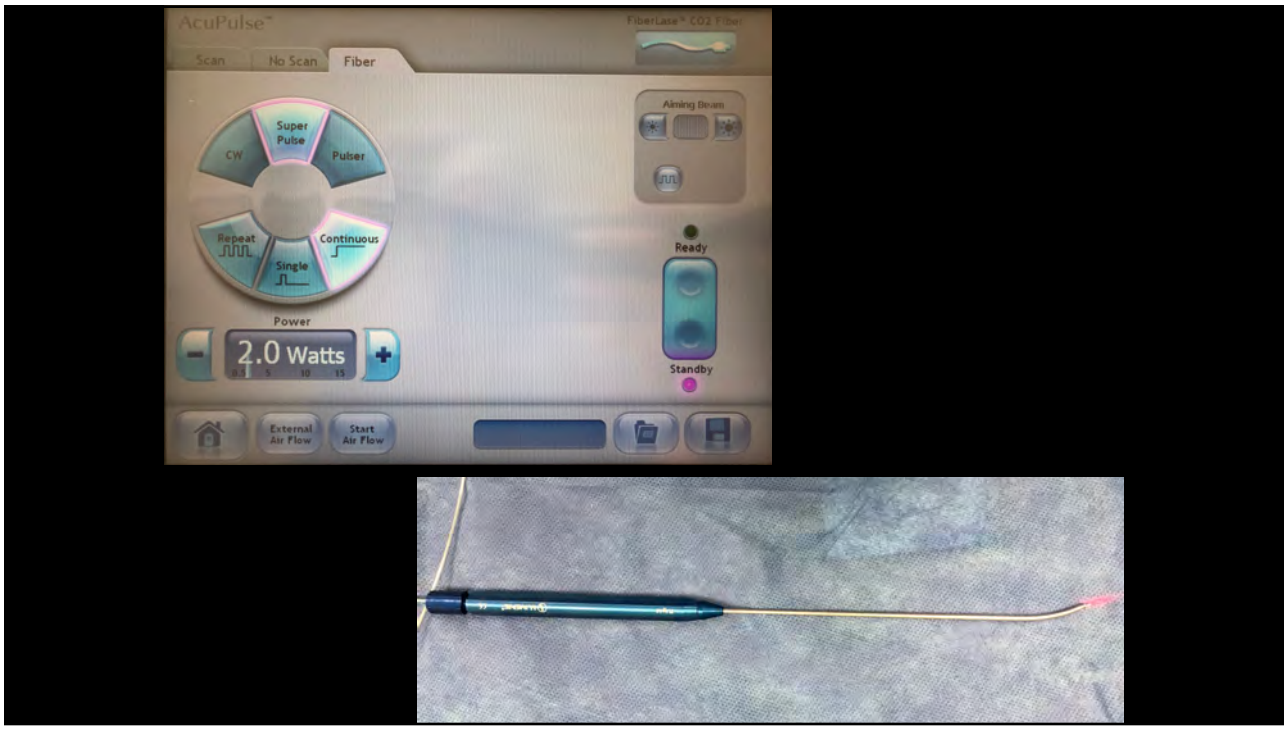
AcuPulse
Scan
No Scan
Fiber
Super Pulse
CW
Pulser
Repeat
Continuous
Single
Power
2.0 Watts
Aiming Beam
Ready
Standby
External Air Flow
Start Air Flow

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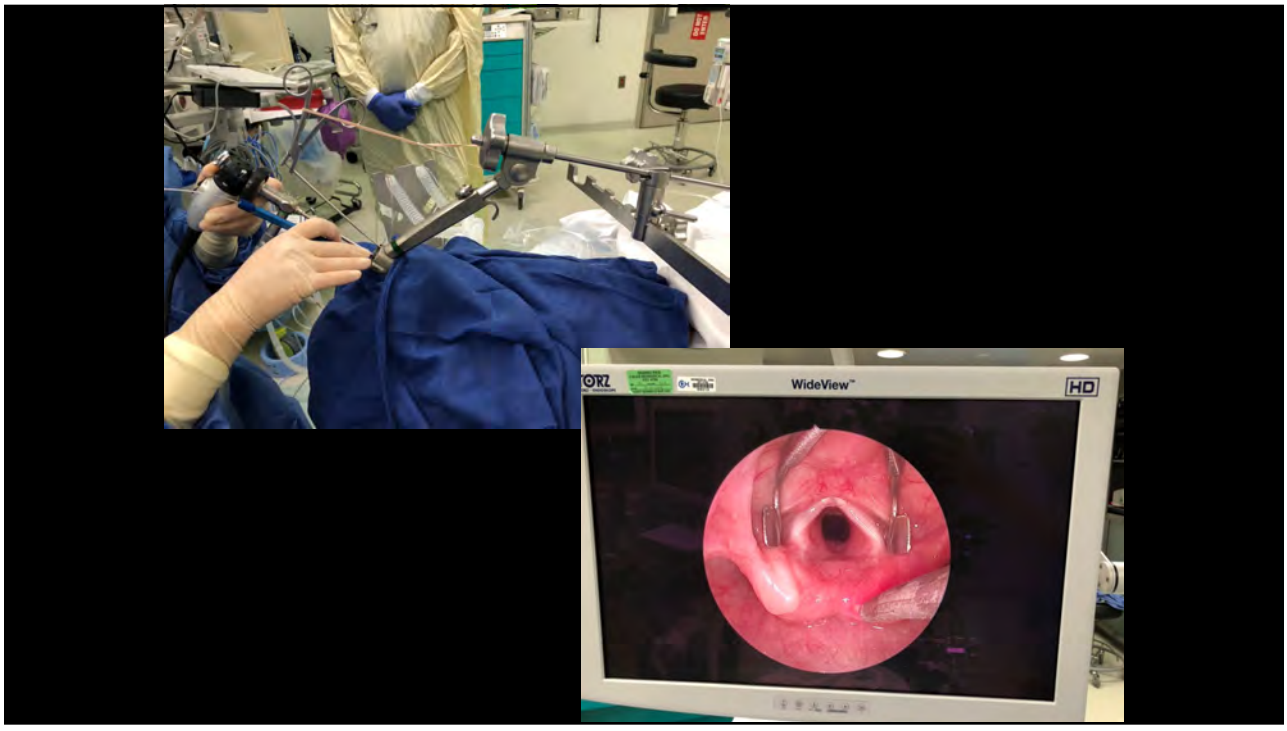
WideView
HD

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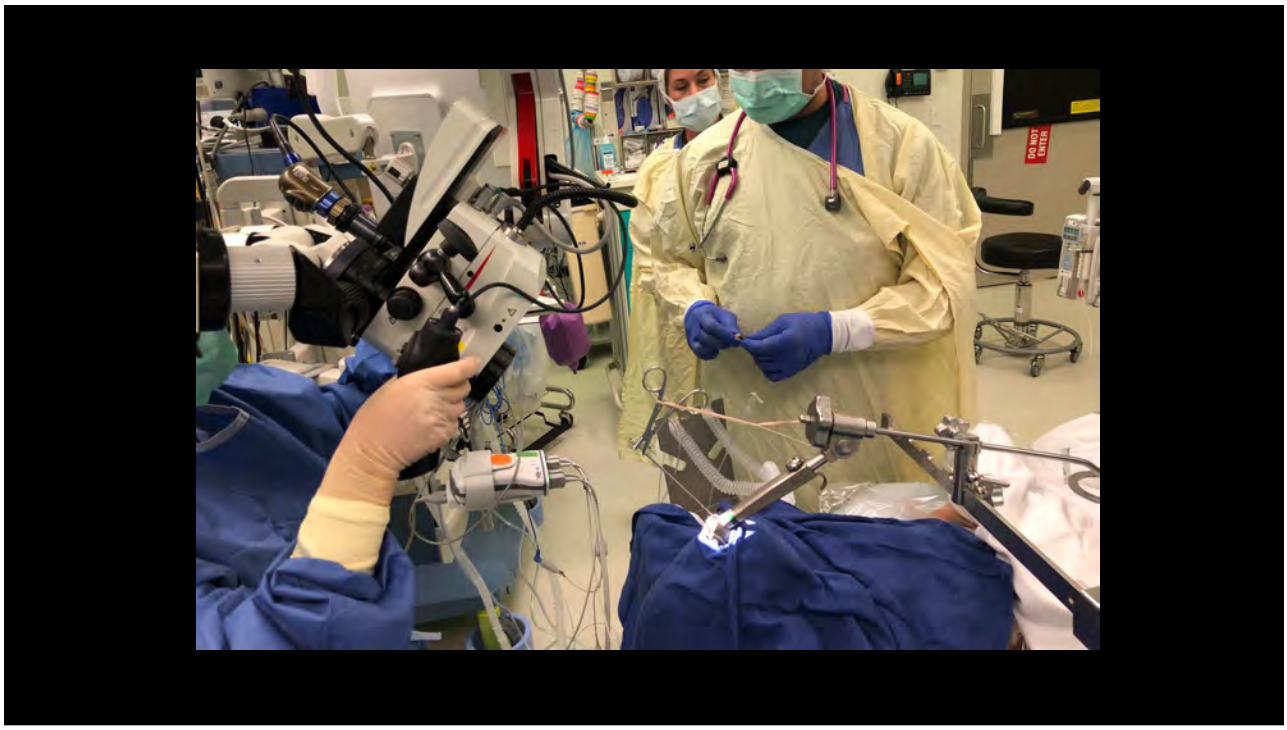

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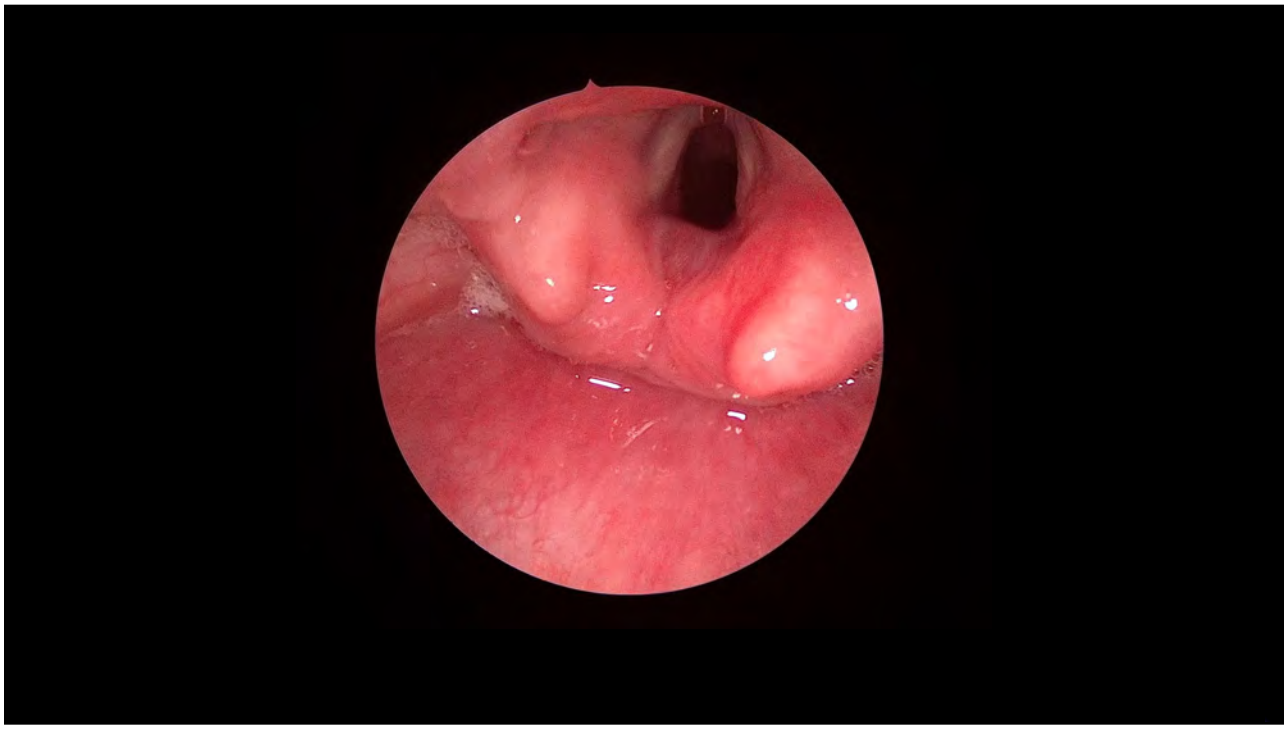

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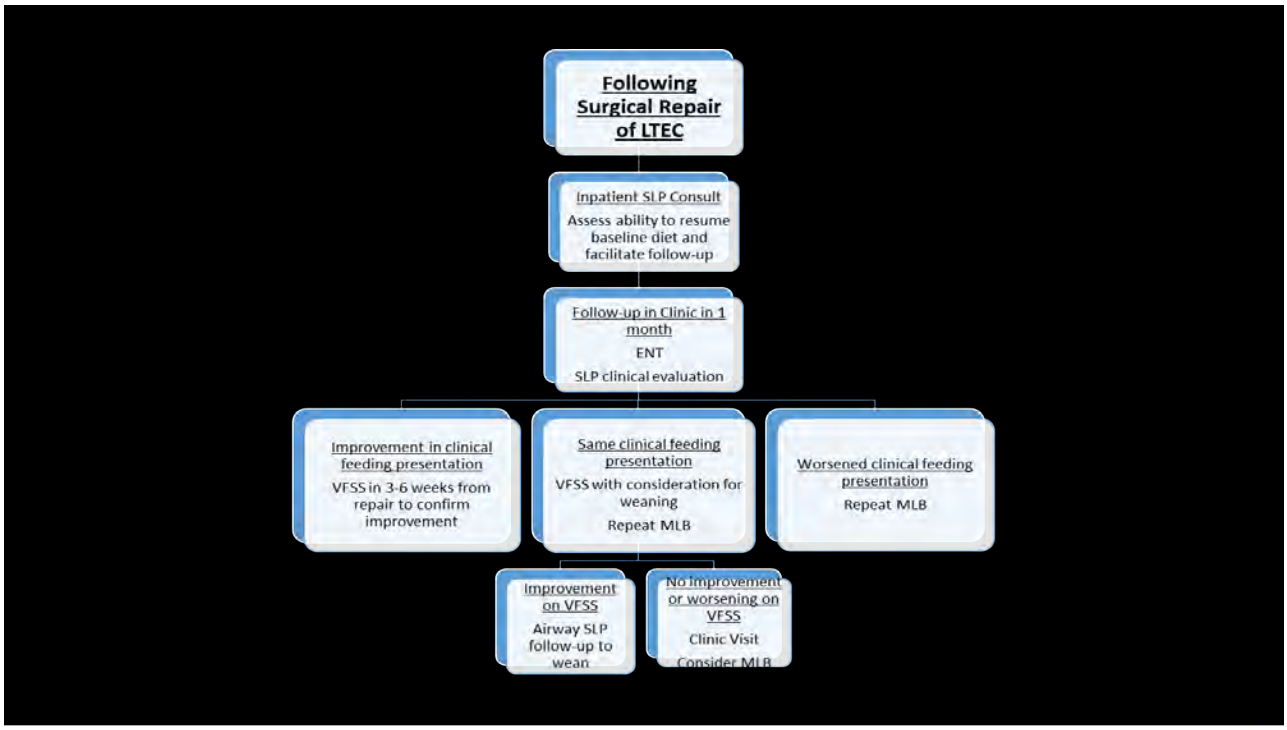
Following Surgical Repair of LTEC
Inpatient SLP Consult
Assess ability to resume baseline diet and facilitate follow-up
Follow-up in Clinic in 1 month
ENT
SLP clinical evaluation
Improvement in clinical feeding presentation
VFSS in 3-6 weeks from repair to confirm improvement
Same clinical feeding presentation
VFSS with consideration for weaning
Repeat MLB
Worsened clinical feeding presentation
Repeat MLB
Improvement on VFSS
Airway SLP follow-up to wean
No improvement or worsening on VFSS
Clinic Visit
Consider MLB

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Following Surgical Repair of LTEC
Inpatient SLP Consult
Assess ability to resume baseline diet and facilitate follow-up
Follow-up in Clinic in 1 month
ENT
Improvement in clinical feeding presentation
VFSS in 3-6 weeks from repair to confirm improvement
Worsened clinical feeding presentation
Repeat MLB
Follow up MBSS at 4-6 weeks and clinical follow up with SLP +/- others

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DO

- Always double check your diagnosis before proceeding
- Question the value of "injections"
- Simplify your postoperative approach
  - This is where your team approach can really shine

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DON'T

- Label everything a "Type 1 Cleft"!
  - What really is a "deep notch" anyhow?
- Operate unless medically optimized
- Promise families immediate success
  - Swallow improvement requires rehabilitation

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Let's CHARGE forward!

- 32 mo male
  - CHARGE
  - TEF with esophageal atresia repaired
  - Multiple cardiothoracic vessel anomalies
    - PDA repaired, transient unilateral VC paralysis
    - Diverticulum of Kommerell with esophageal impingement
  - G-tube, GERD, Nissan
  - Adenotonsillar hypertrophy with OSA
  - CSOM, SNHL

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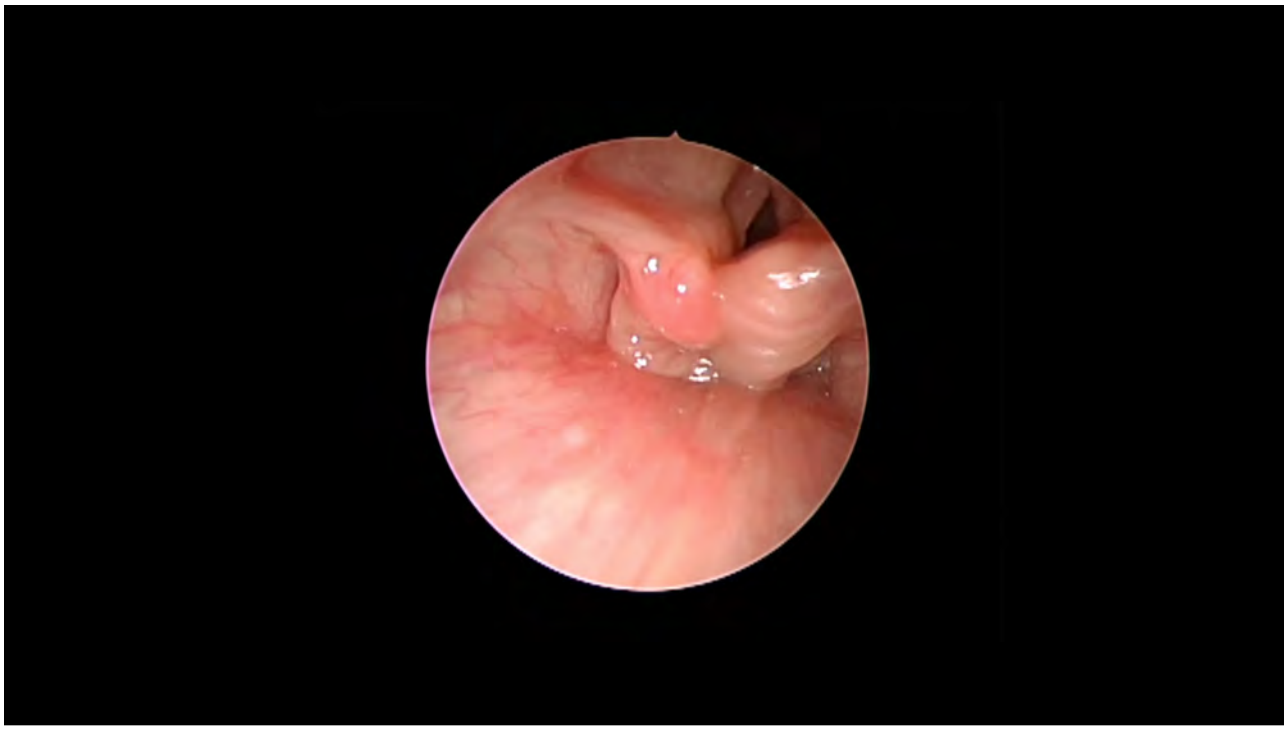

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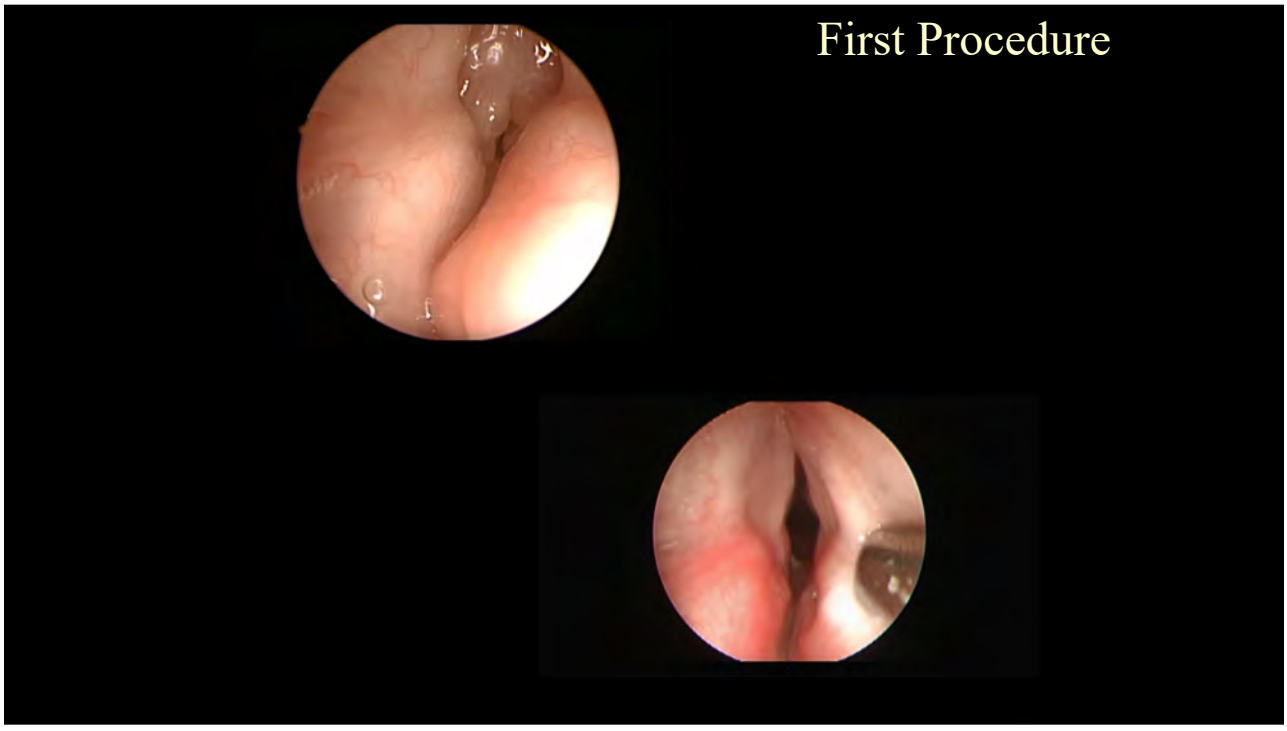

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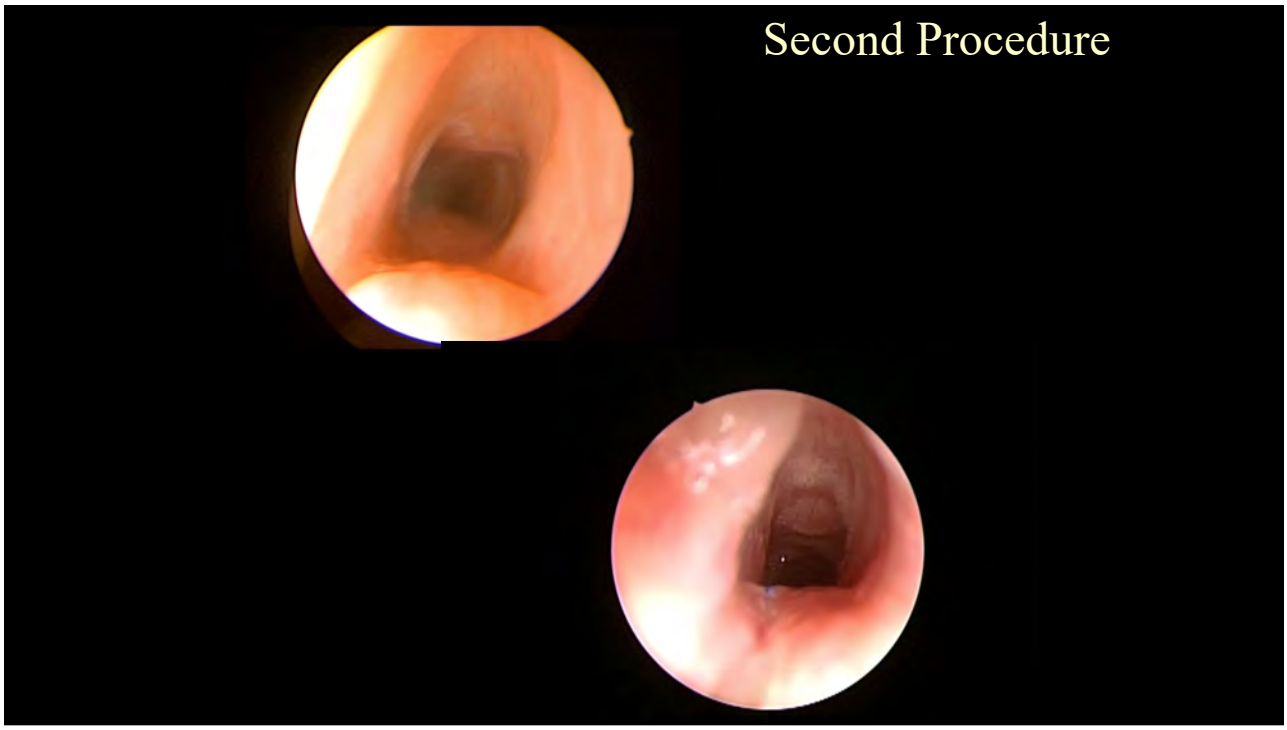

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DO

- Take these patients very seriously!
  - Often have comorbidities
  - May look great awake but misbehave after anesthesia
  - Counsel families that revisions may be necessary

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DON'T

- Give up if the first crack at it doesn't work
  - Optimize
  - Optimize again
  - Take care of all other surgical pathology before tackling the cleft

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LTEC III

- Virtually every one of these cases has thrown me a curve ball
- The two intraoperative "codes" that I have had have been in these patients
- Both endoscopic and open repair techniques have been described for these cases

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Such Disrespect!!!

- 6 week old male
  - 33 week preme
  - Airway distress at birth, difficulty ventilating
  - MLB DOL#3 diagnosed with LTEC Type III
  - Extubated and eventually weaned off oxygen
  - Transferred to CHOP for second opinion on management
  - Exam: Room air, NO STRIDOR, Weight: 2.5 kg

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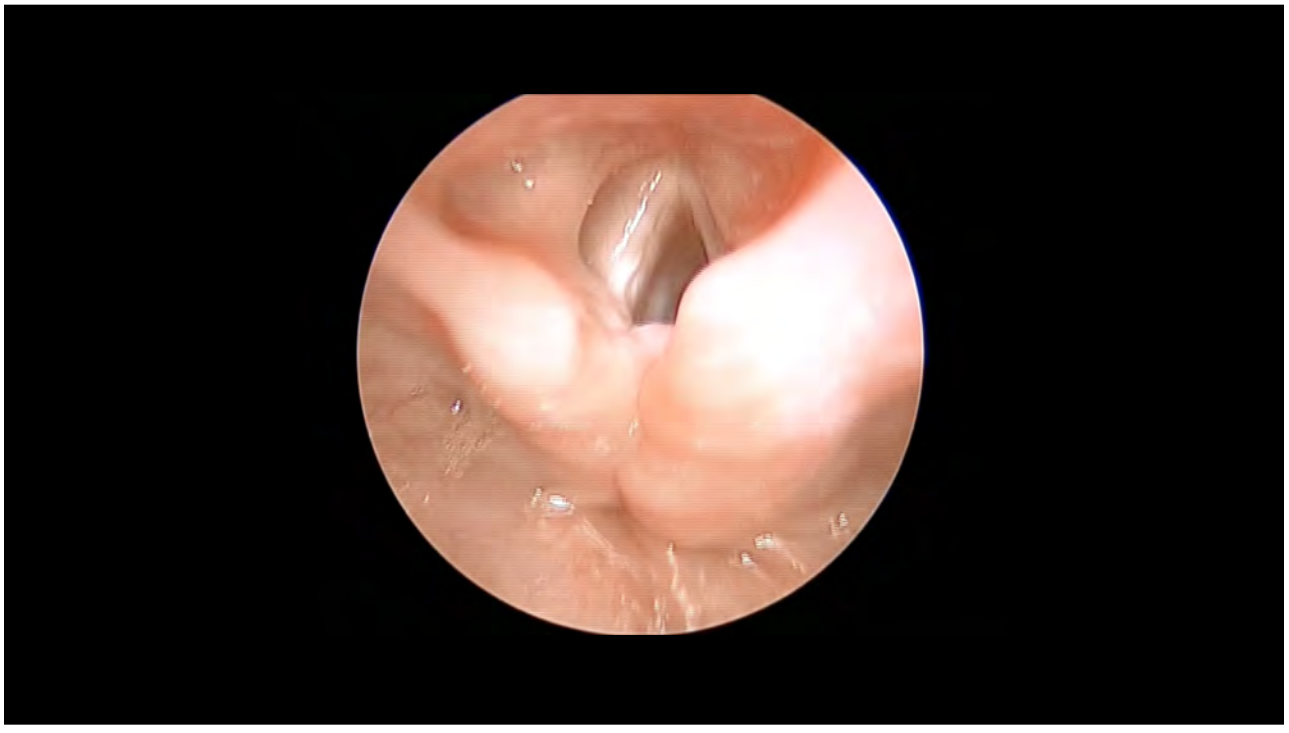

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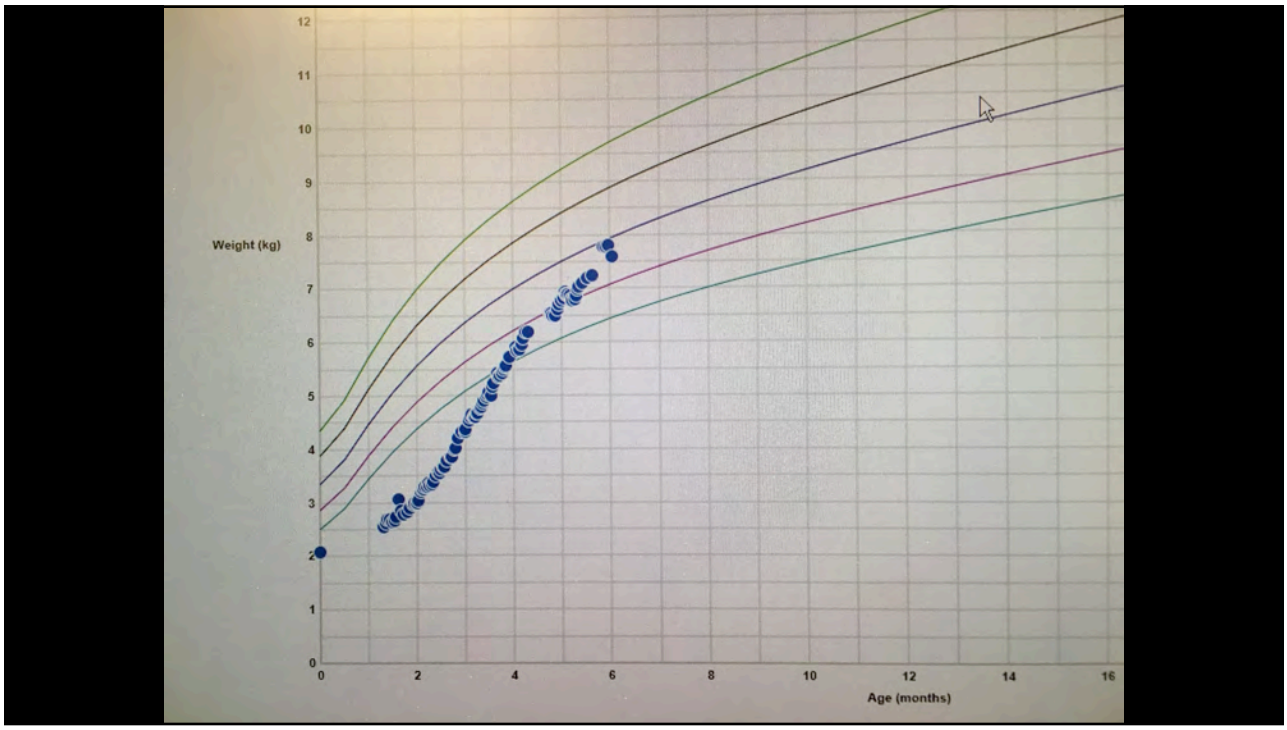

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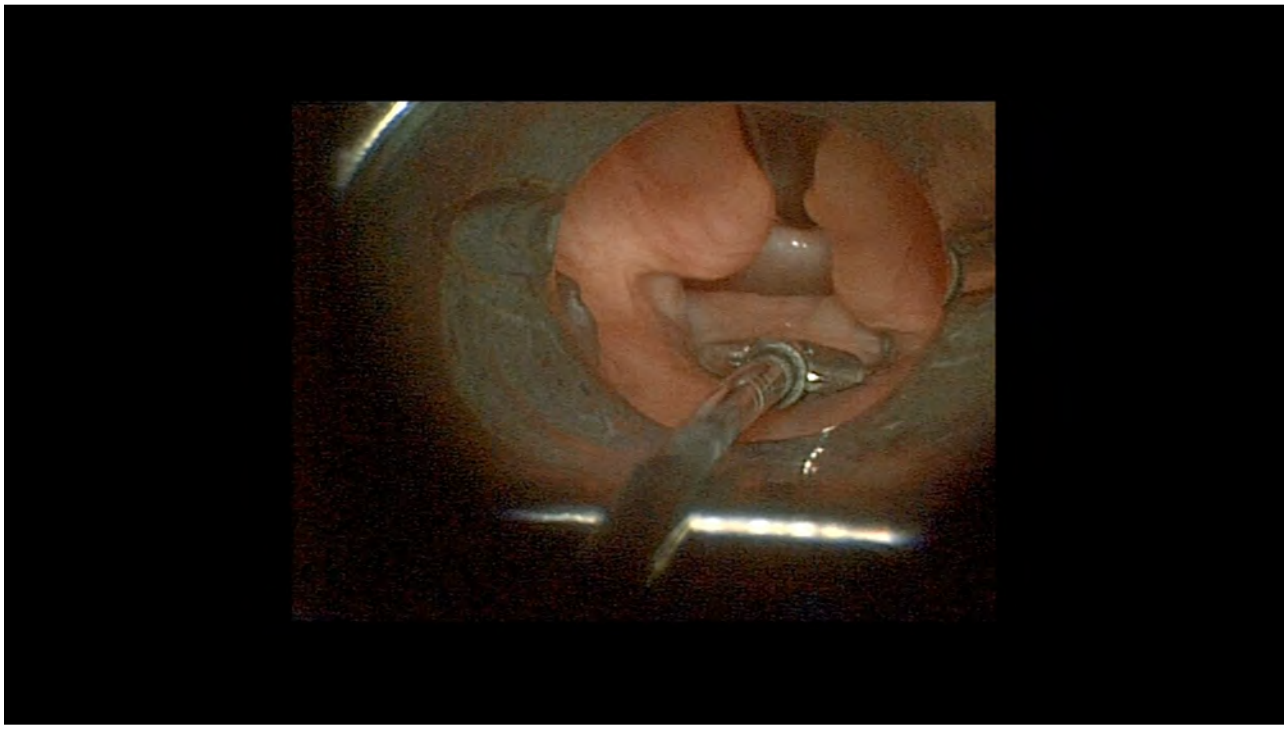

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Such Bravado!

- Look at us, closing up a Type III LTEC endoscopically. Yay!! Woohoo!! Winning!!! We ROCK…
- Let's just drop him off in the PICU and go grab a drink!
- Plan will be to extubate in the morning after we round on him…

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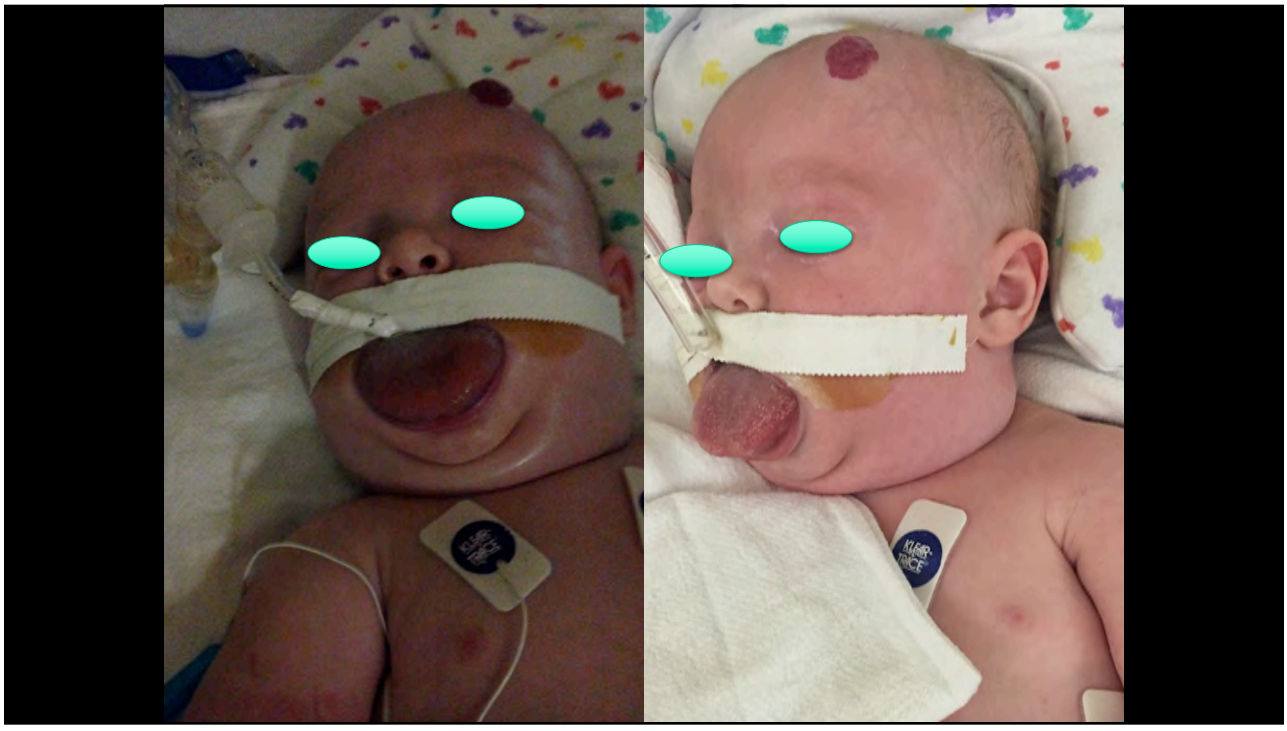

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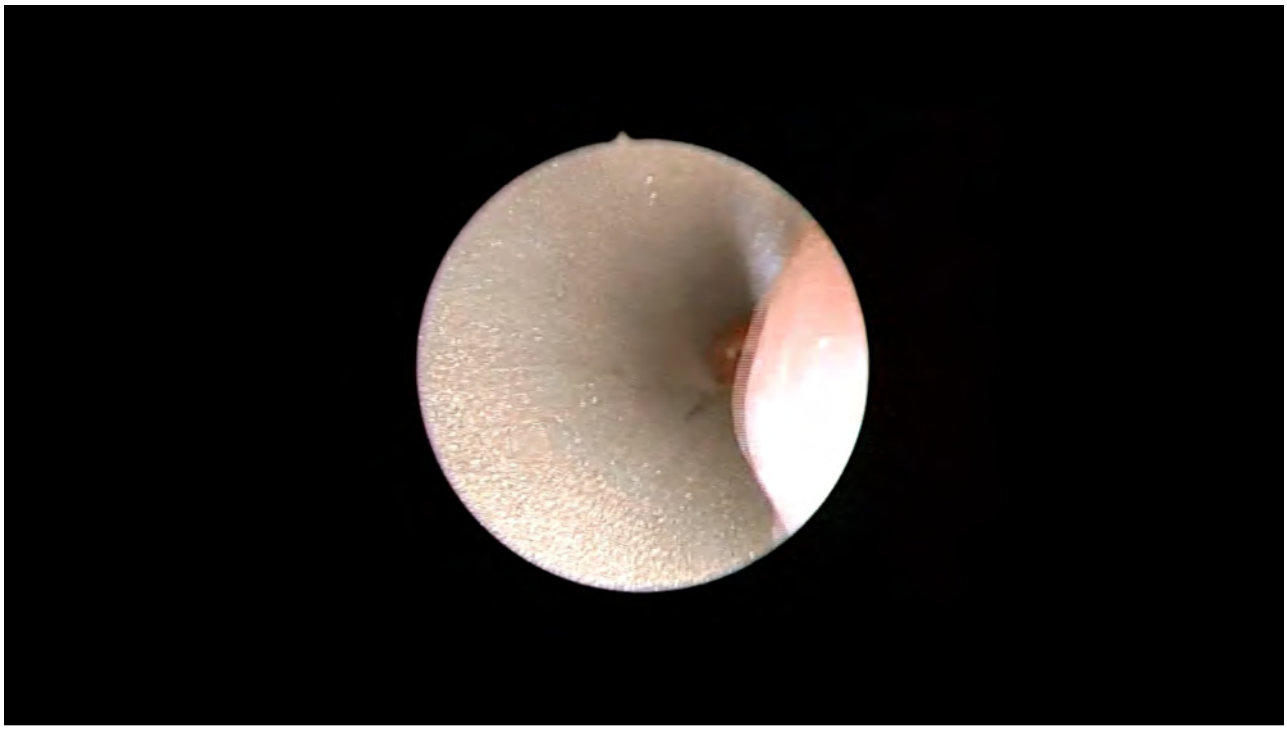

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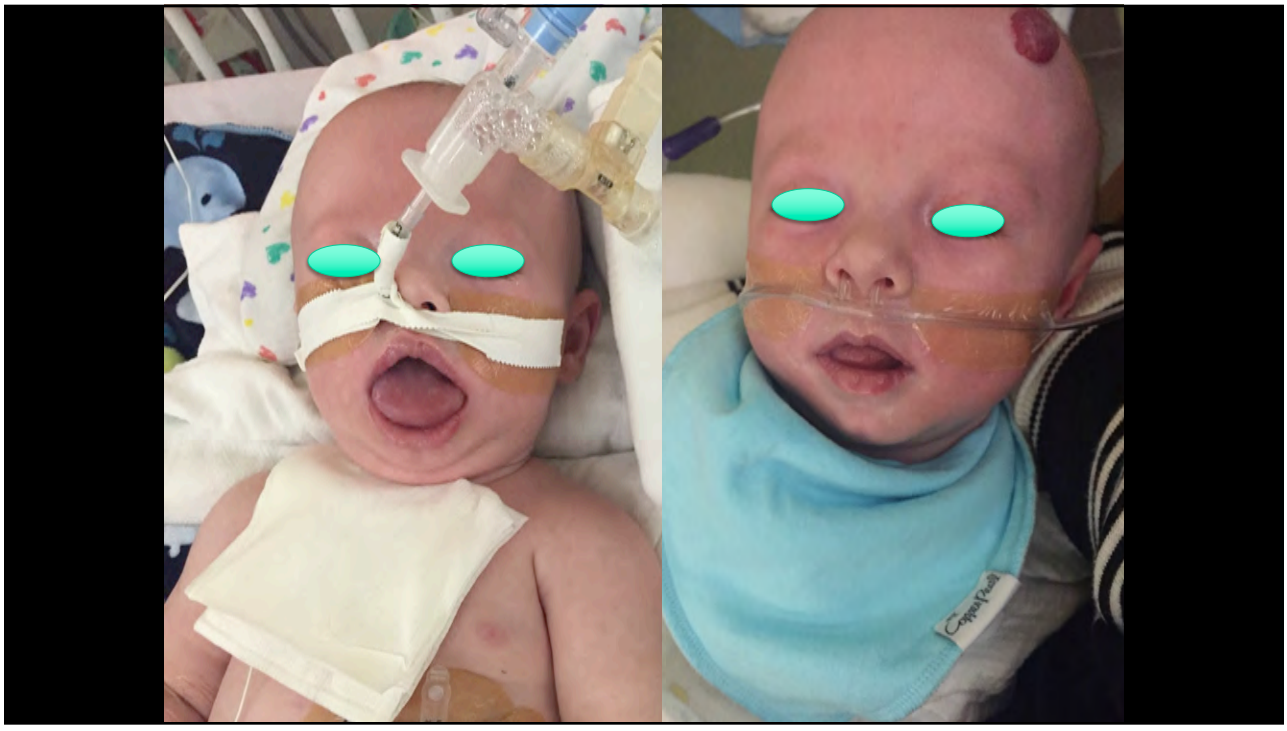

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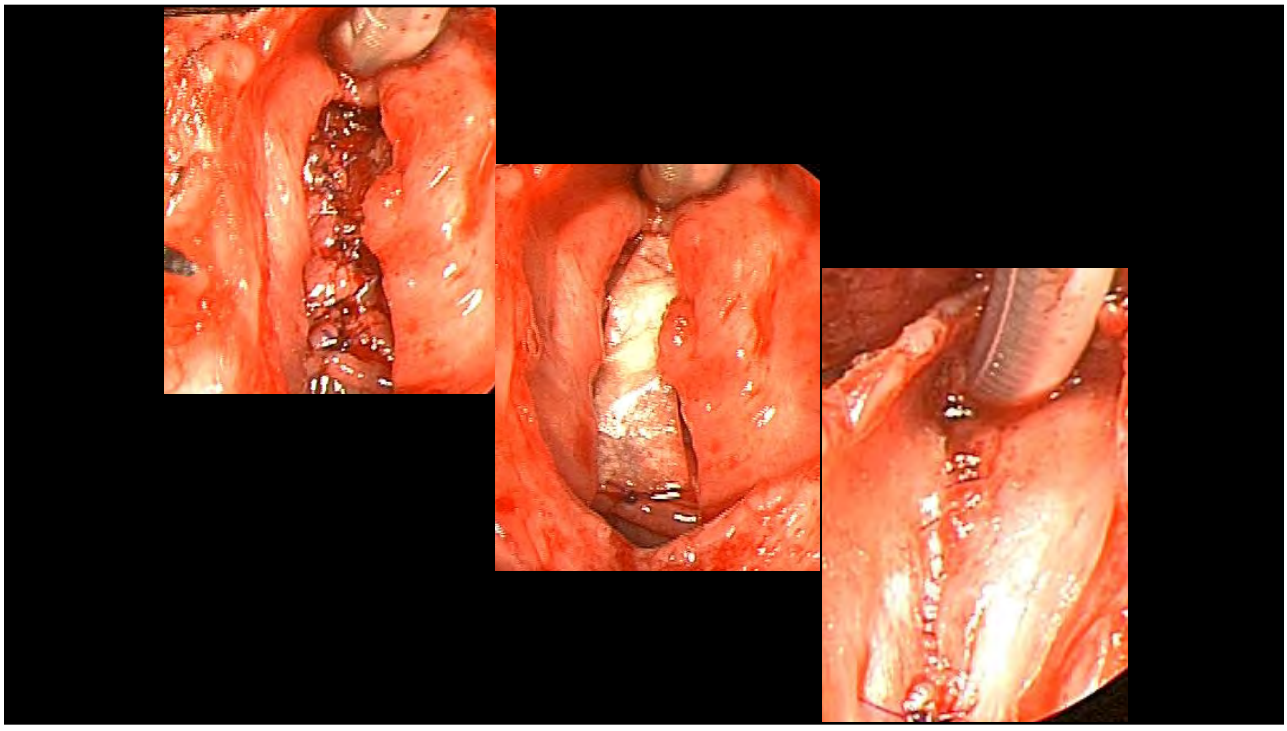

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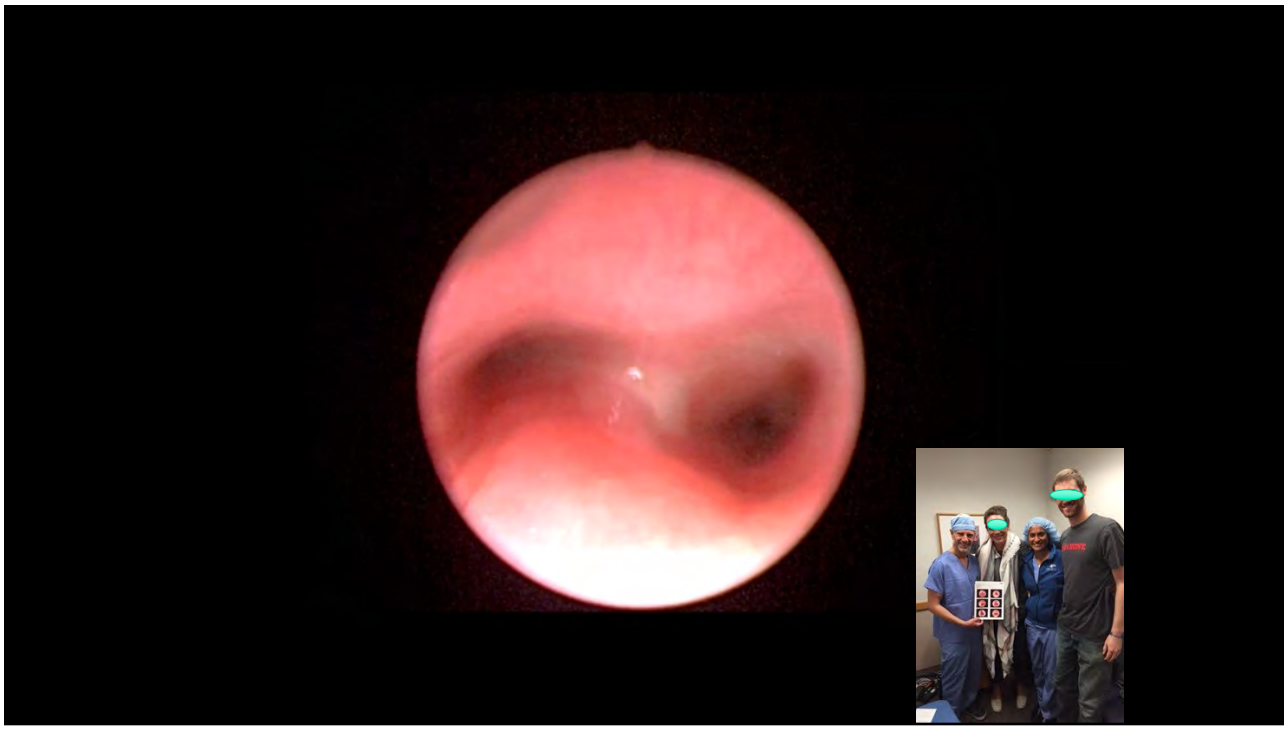

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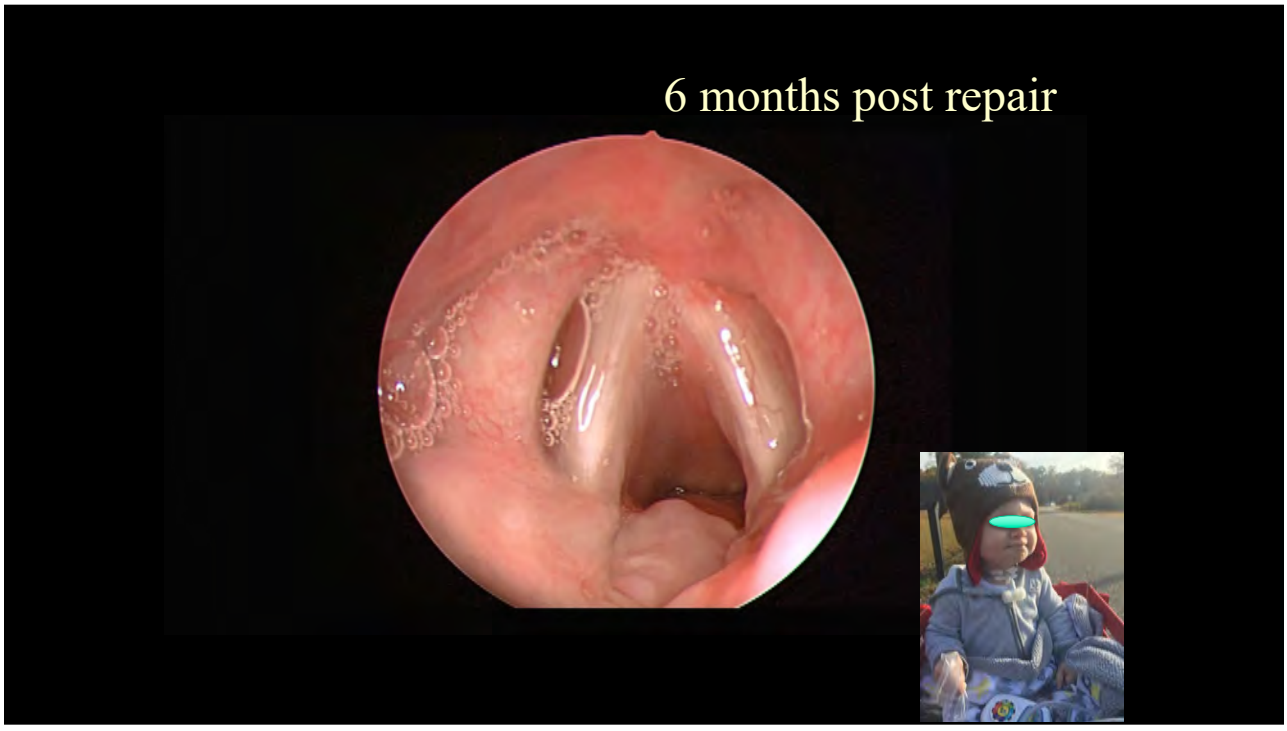

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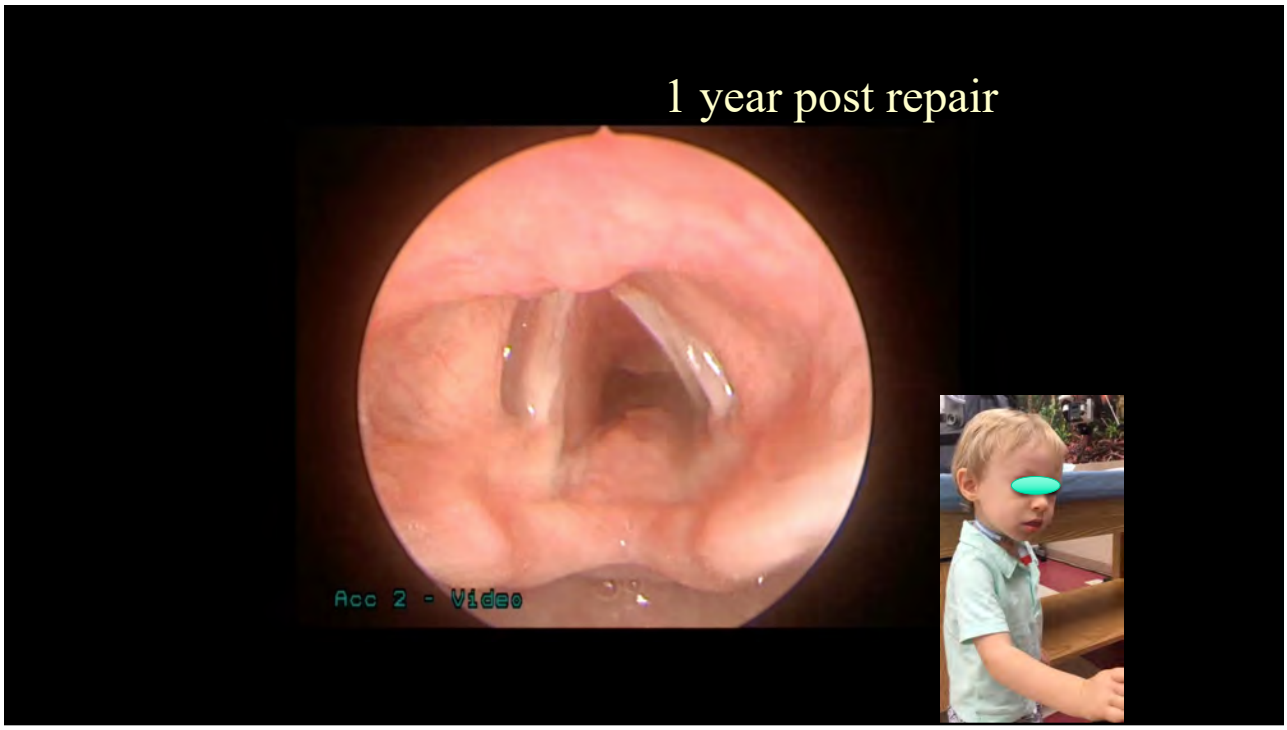

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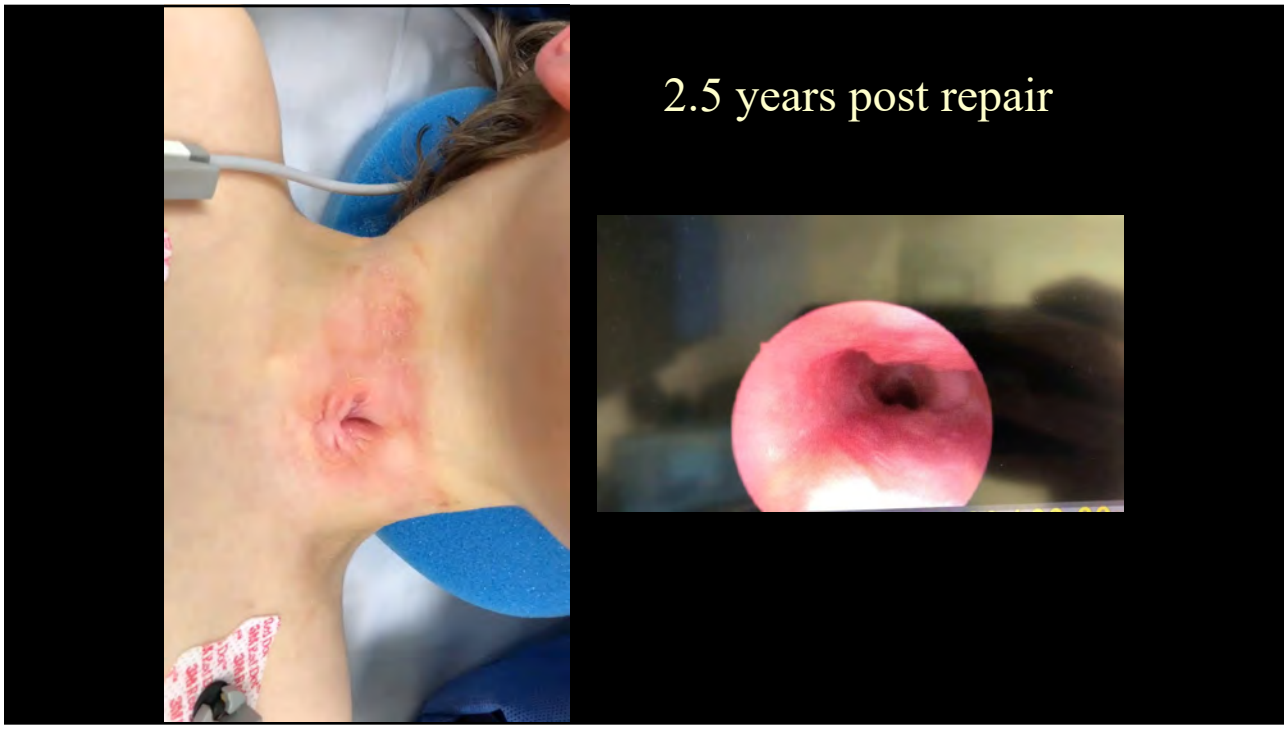

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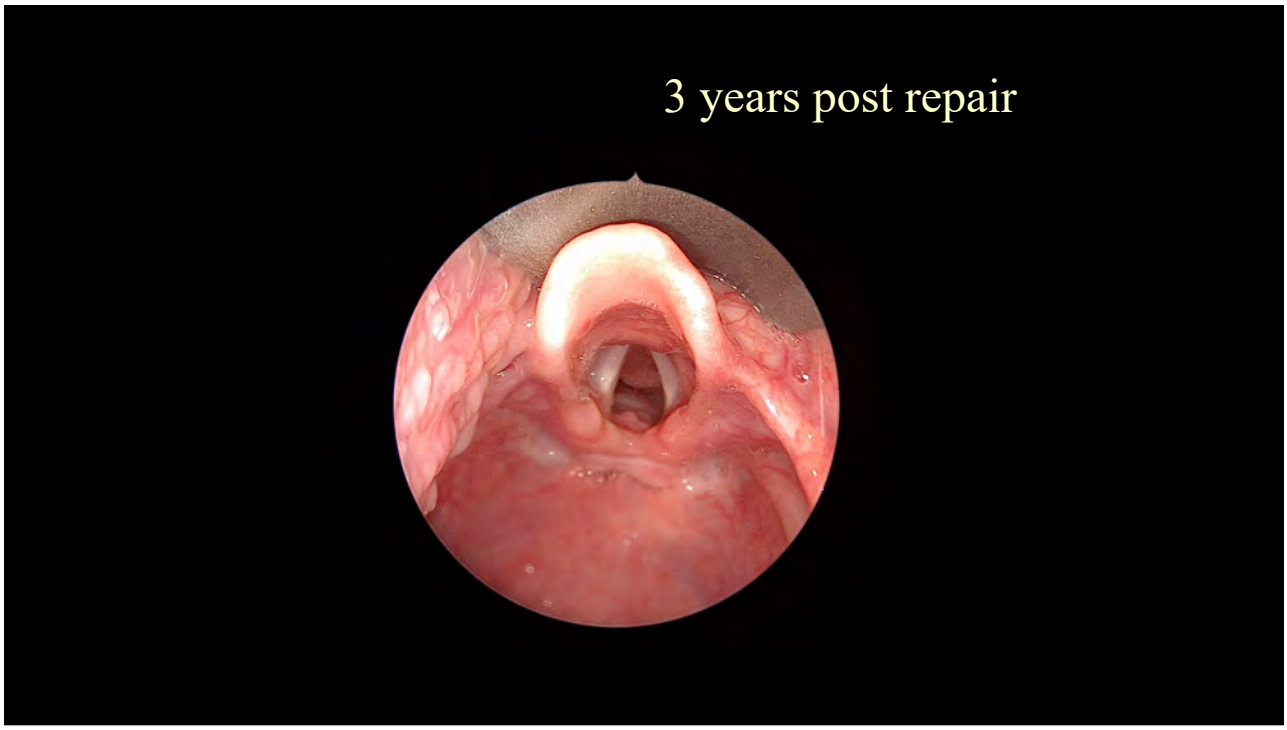

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This one is really the (O)pitz!!!

- 5 week old male
  - 29 week gestation
  - Respiratory distress at birth → Intubated
  - Thought to have TEF→Transferred to CHOP
  - Cleft lip and plate
  - Hypospadius
  - Diagnosed with Optiz GBBB

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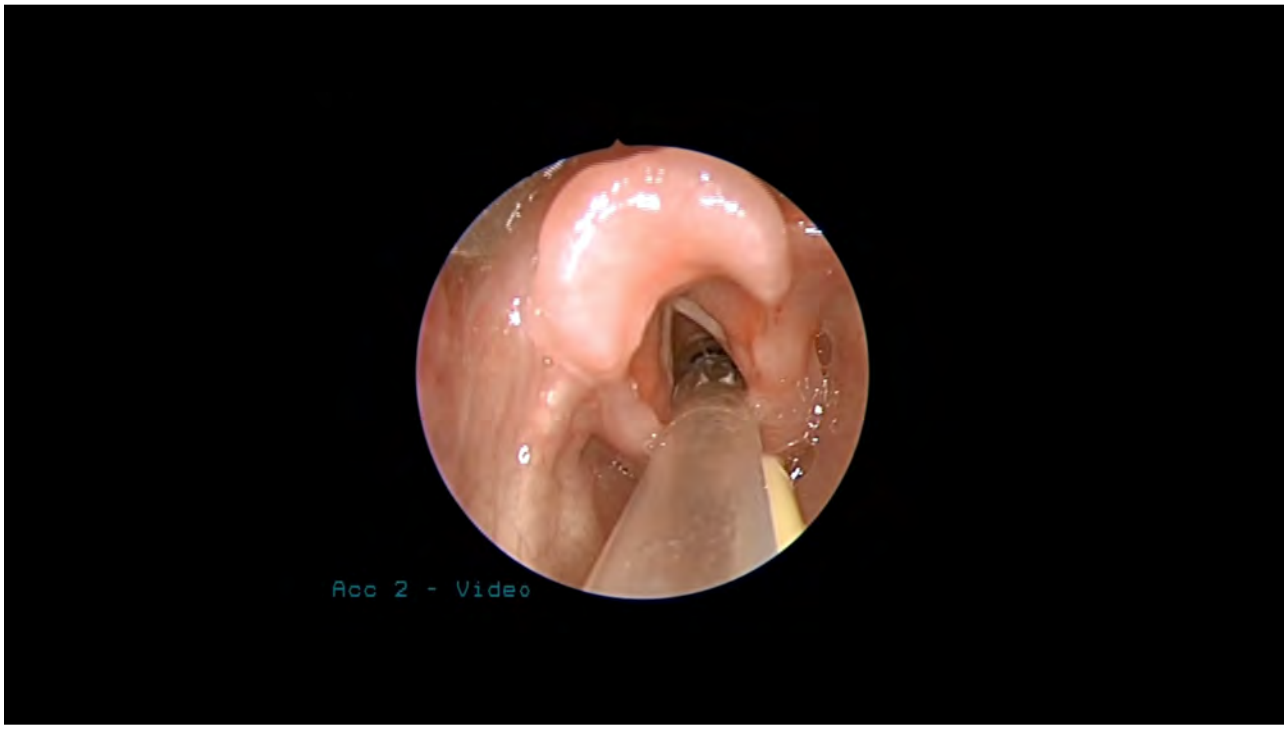

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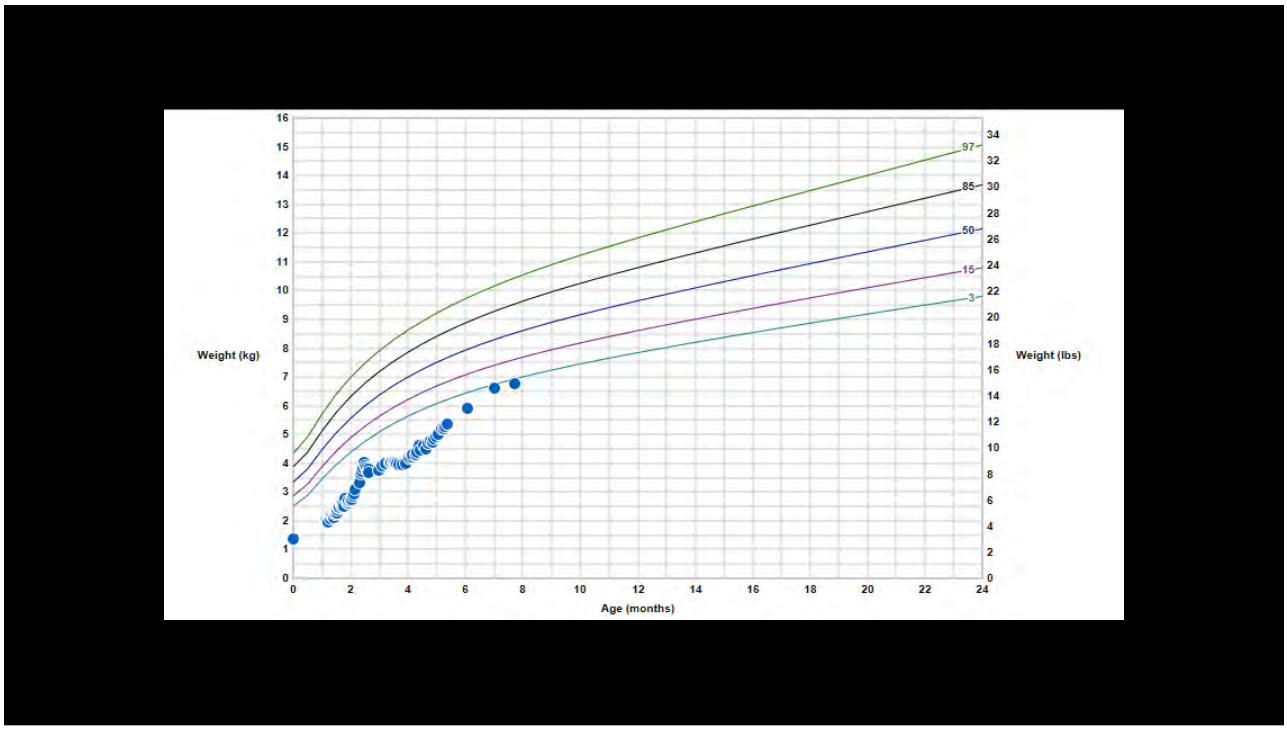

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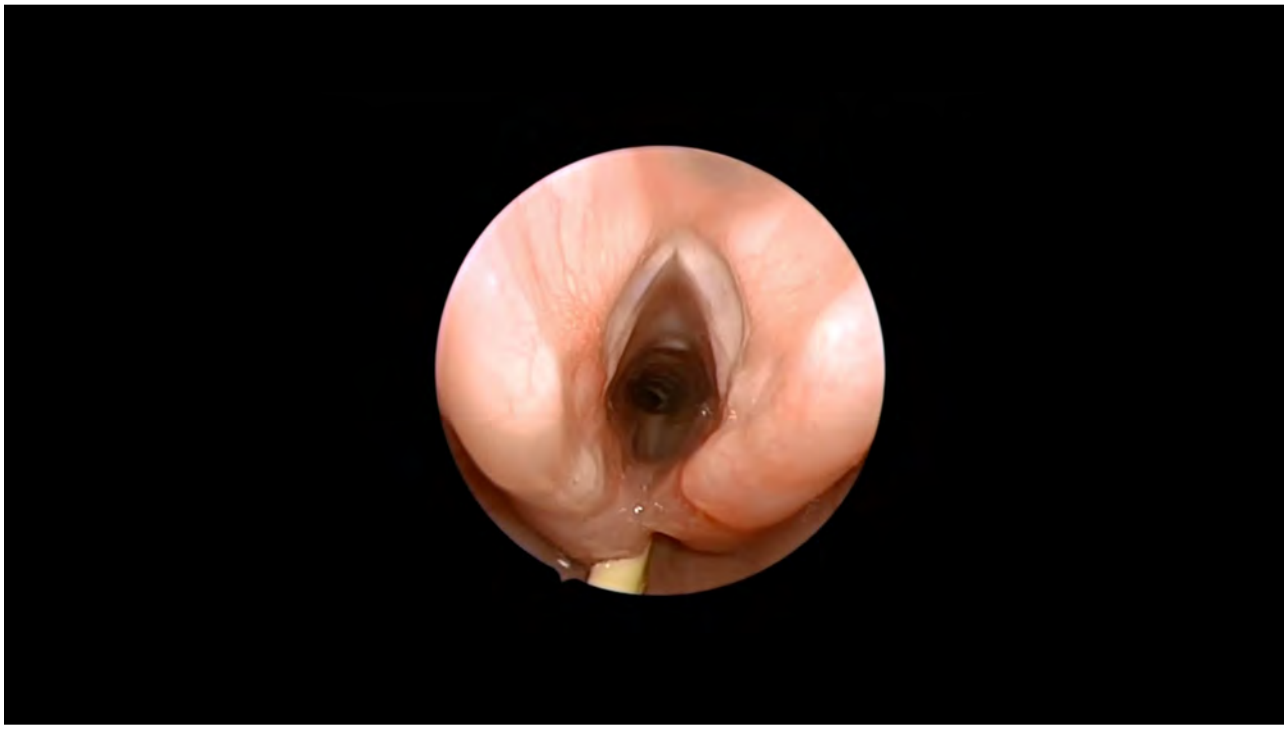

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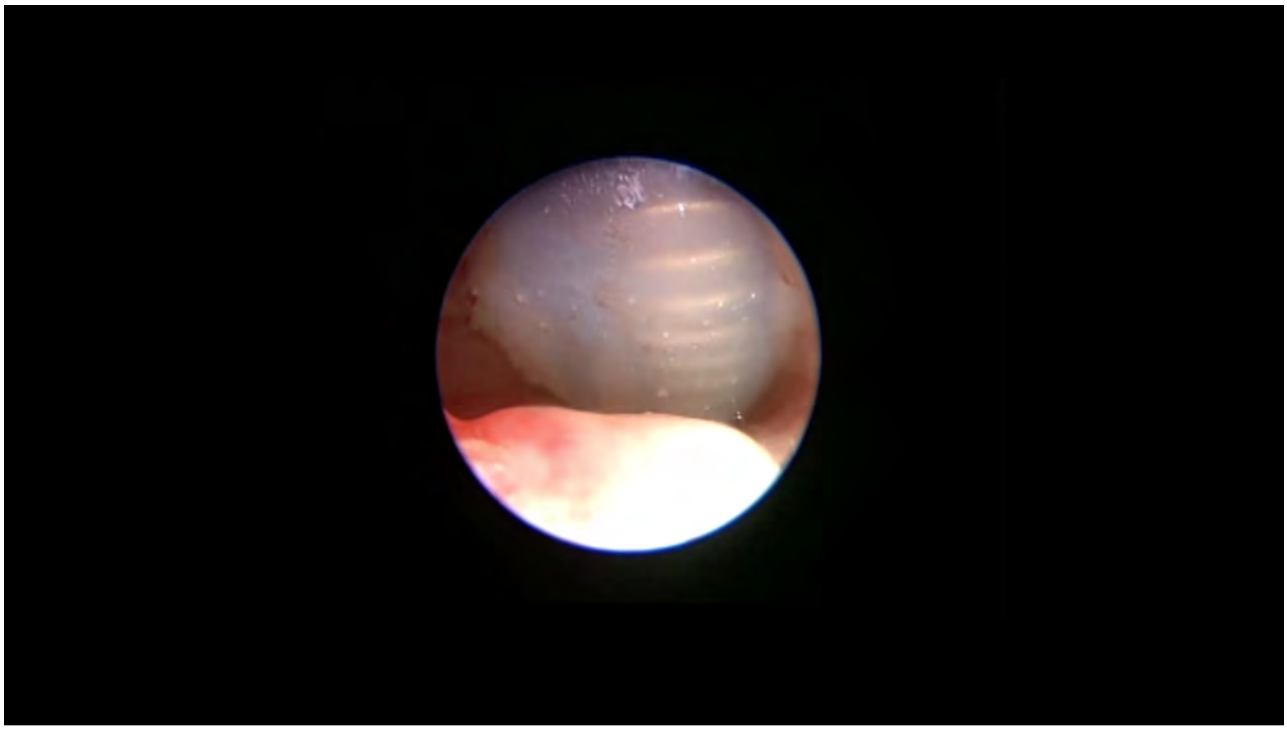

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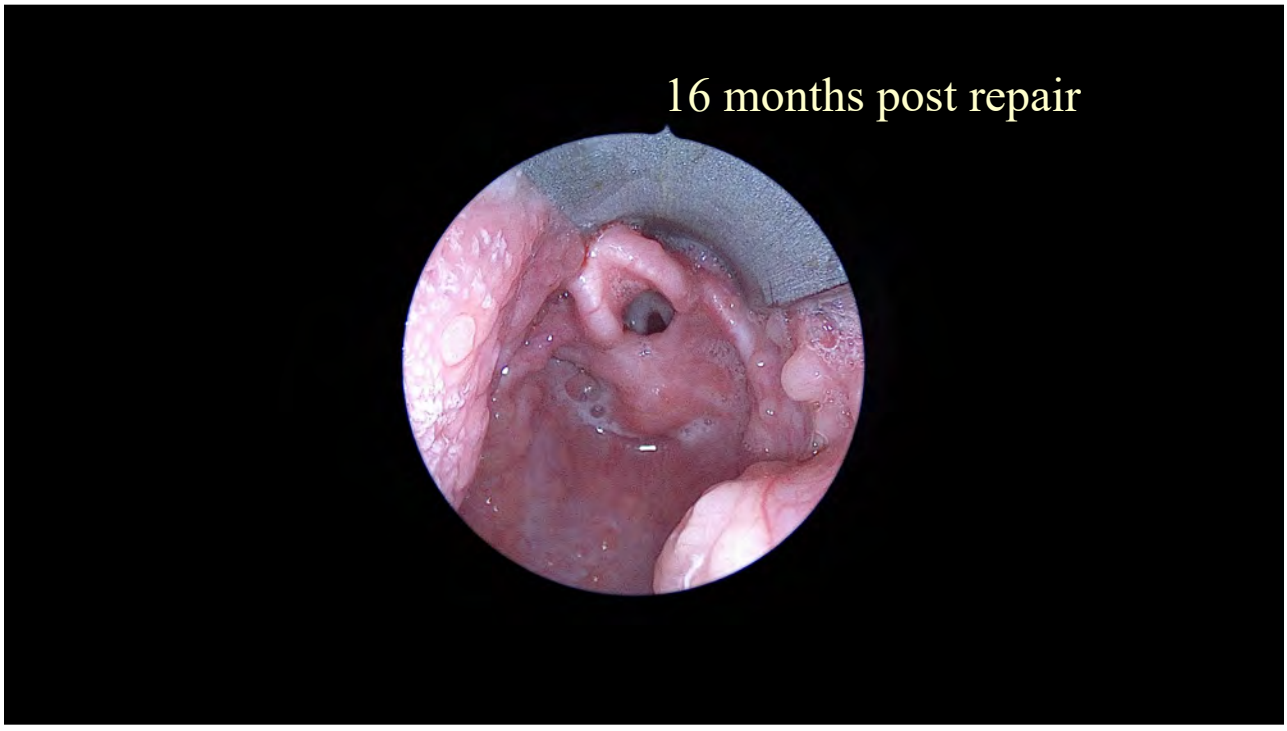

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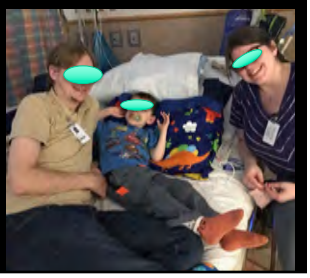
This one is really the (O)pitz!!!

- So, we are doing great here and ultimately decannulate our patient. Yay!! Woohoo!! Winning!!! We ROCK…
- …And a year later try and close the TCF…
- Leading to immediate distress and replacement of the trach…



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DO

- Have a very healthy respect for these patients
  - Many are syndromic
  - Tracheomalacia may present intra or postoperative issues
- Question the ability of endoscopic repair to fix these

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DON'T

- Operate until you sort out and optimize comorbidities
- Underestimate the changes in the airway dynamics post-repair
- Assume that your repair is "successful" without longitudinal endoscopic follow up

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LTEC IV

- Newborn female
  - 27 week, 830 gram, twin
  - Respiratory distress at birth, positional ETT
    - Presumptive diagnosis of TEF
  - Distress at DOL #3
    - Bedside MLB concerning for LTEC
    - Pulmonary reserve poor
    - Requires oscillator

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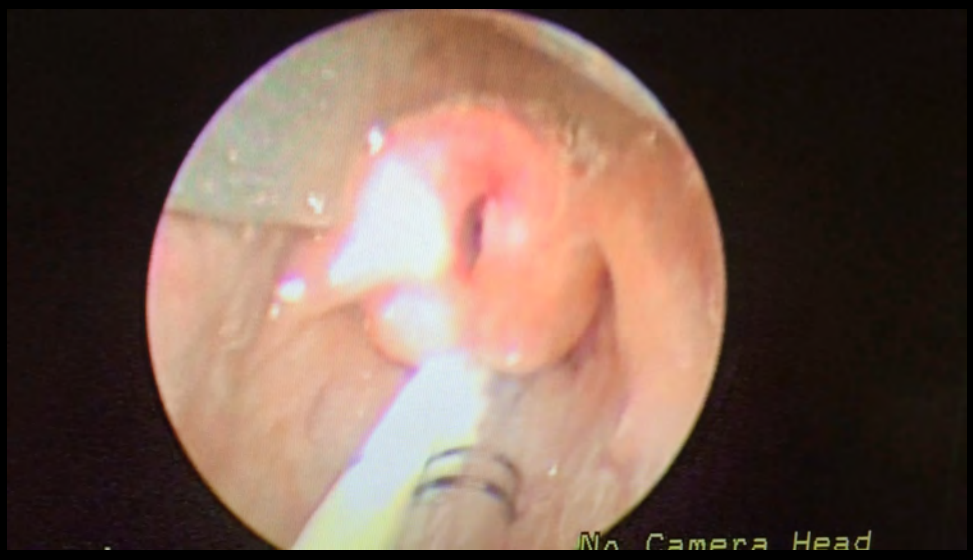

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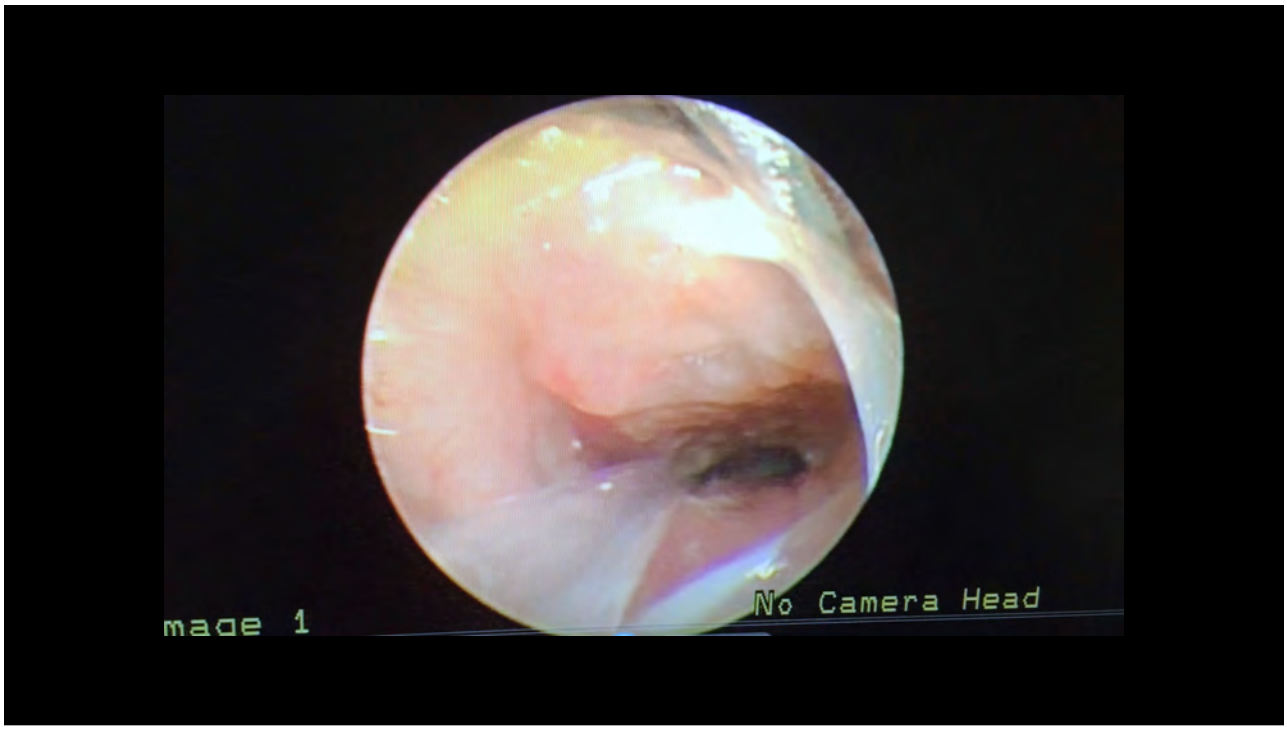

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LTEC IV

- By 5 months of age…
  - "Stable"
  - Fellow at bedside 2-3x/week to reposition ETT and scope
  - Parents want everything done
    - Mom: Lawyer
    - Dad: Son of an orthopedic surgeon

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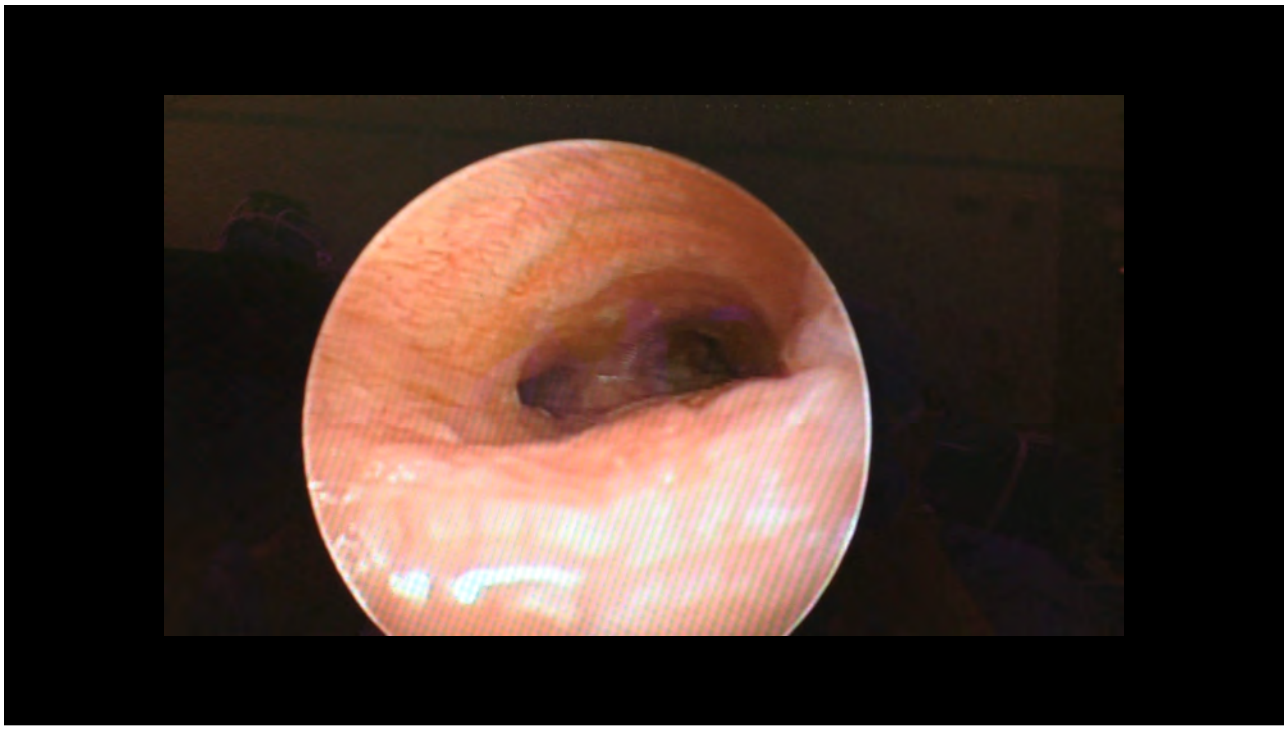

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Would you offer an operation???

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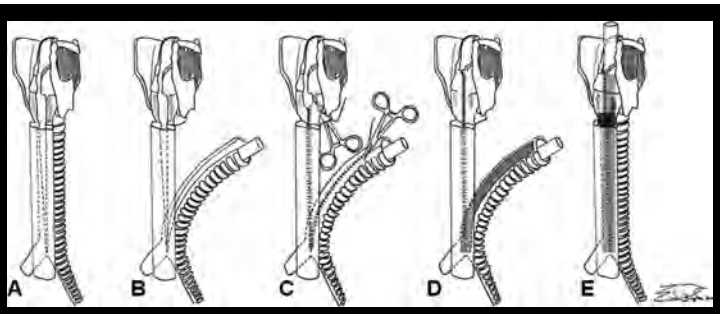

Repair of long type IV posterior laryngeal cleft through a cervical approach using cricotracheal separation‡

Evan J. Propst MD,Jonathan B. Ida MD,Michael J. Rutter MD

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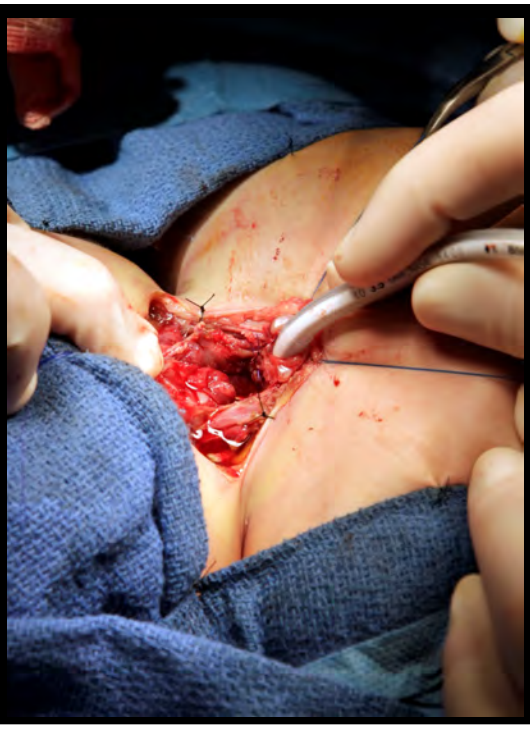

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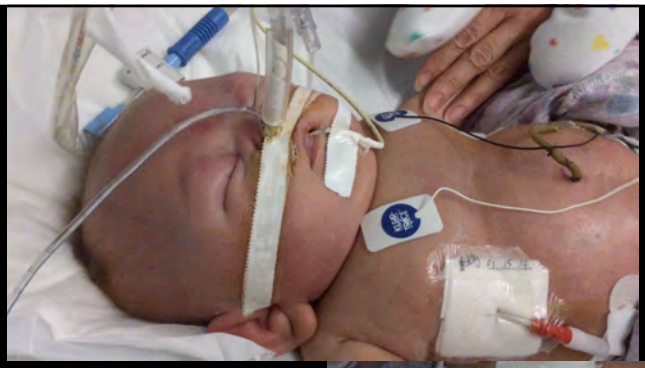
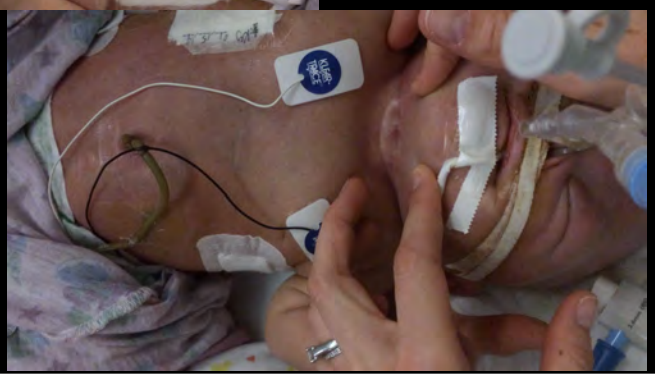


- Edema
- Edema
- Edema
- Effusion
- …sad end



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Conclusions

- Define who you want to be
  - We are surgeons and like to fix things
- Create a systematic triage process
  - And stick to it!
- Define and question what is and when to repair a Type I cleft
- Have a very healthy respect for advanced LTECs

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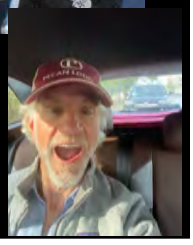
THANK YOU!





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